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Danielson

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(54) **REMOTELY MANAGING PLAYER DATA**

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(52) **U.S. Cl.**
CPC ***G07F 17/3239*** (2013.01)

(58) **Field of Classification Search**
CPC G07F 17/3239
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

8,216,058	B2	7/2012	Anderson et al.	
8,303,403	B2	11/2012	Anderson et al.	
8,313,371	B1 *	11/2012	Luciano, Jr.	G07F 17/3255 463/19
8,342,944	B2	1/2013	Gagner et al.	
8,684,826	B2	4/2014	Englman et al.	
8,944,916	B2	2/2015	Abouchar et al.	
9,061,203	B2	6/2015	Miller	
9,361,766	B2	6/2016	Englman et al.	
9,508,219	B2	11/2016	Garvey et al.	
10,140,816	B2	11/2018	Nguyen	
2008/0300049	A1 *	12/2008	Anderson	G07F 17/3267 463/25
2009/0054136	A1 *	2/2009	Gagner	G07F 17/32 463/25
2010/0227691	A1 *	9/2010	Karsten	G07F 17/32 463/42
2010/0317424	A1 *	12/2010	Hornik	G07F 17/32 463/43
2013/0303270	A1	11/2013	Vann	
2014/0094277	A1	4/2014	Guinn et al.	
2019/0340871	A1	11/2019	Miri et al.	
2020/0342716	A1	10/2020	Strause et al.	
2021/0049869	A1 *	2/2021	Chan	G07F 17/3213

* cited by examiner

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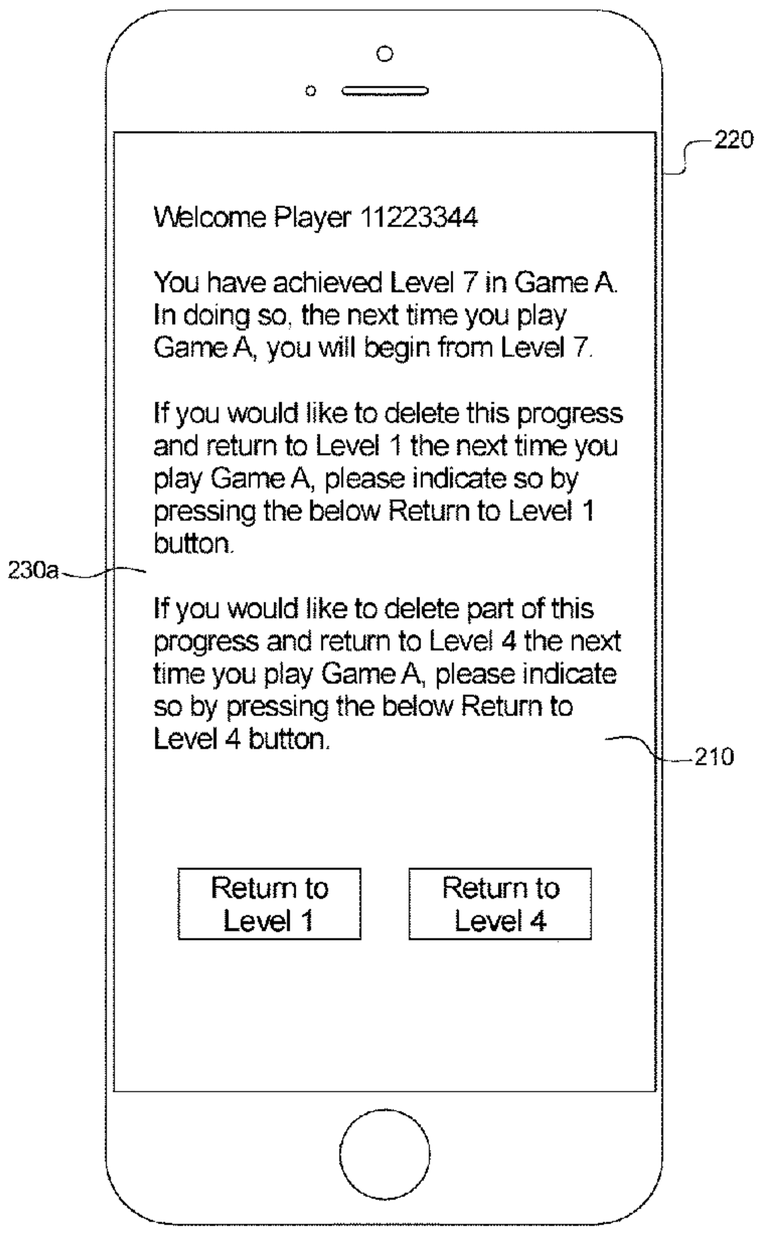
(57) **ABSTRACT**

Systems and methods that enable a user, such as a player, to manage persistent data, such as game state data, remote from any electronic gaming machine, such as via a mobile device executing a mobile device application.

20 Claims, 7 Drawing Sheets



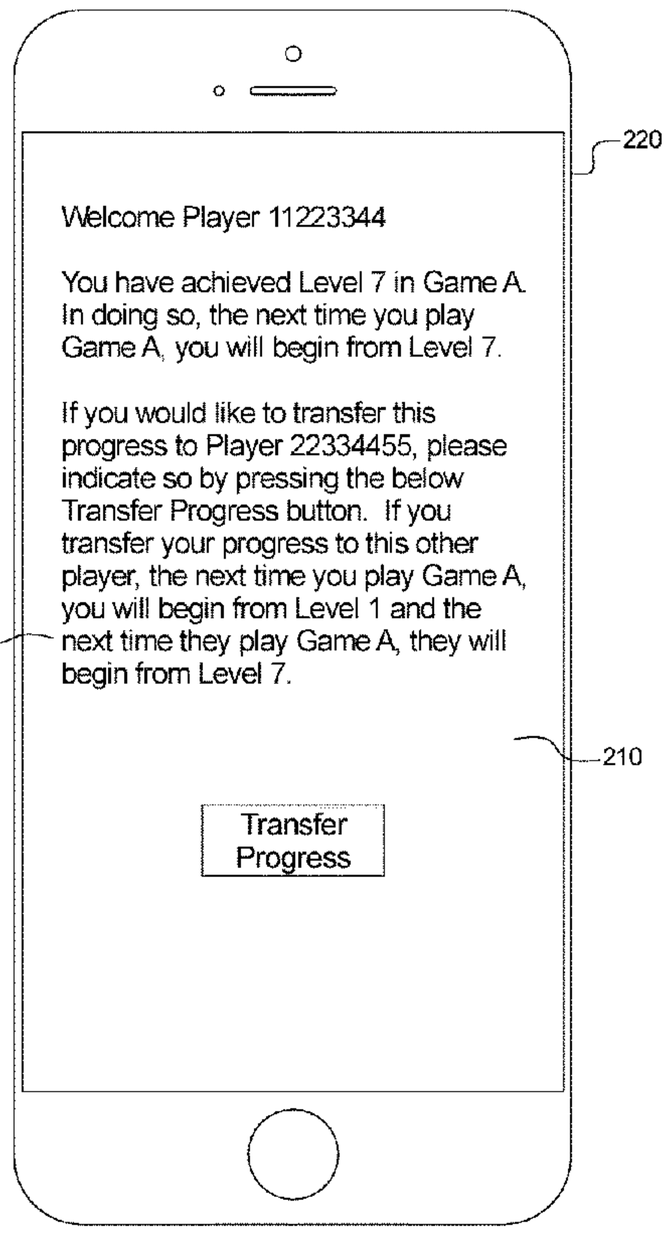


FIG. 1

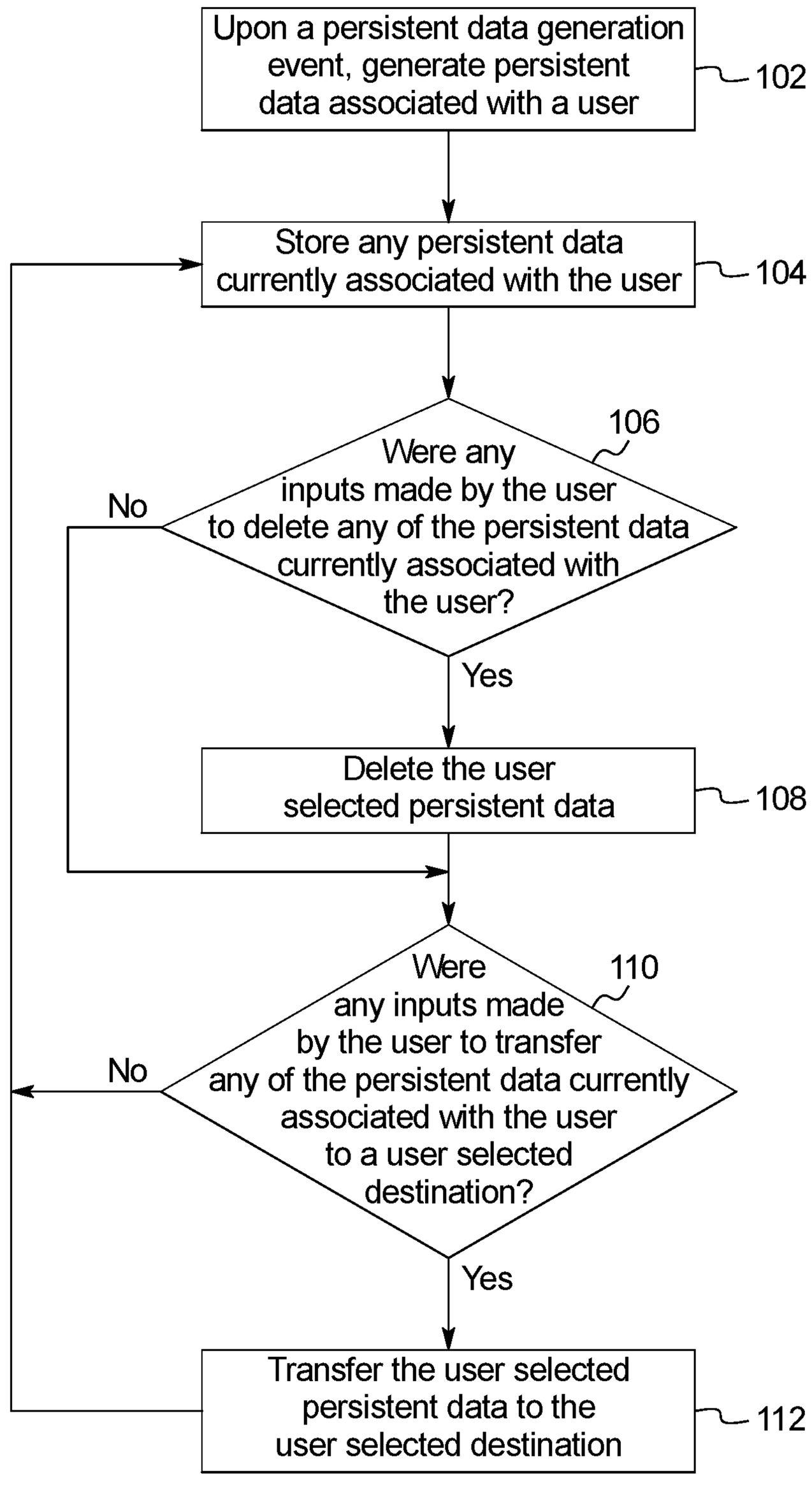

Upon a persistent data generation event, generate persistent data associated with a user
102
Store any persistent data currently associated with the user
104
Were any inputs made by the user to delete any of the persistent data currently associated with the user?
106
No
Yes
Delete the user selected persistent data
108
Were any inputs made by the user to transfer any of the persistent data currently associated with the user to a user selected destination?
110
No
Yes
Transfer the user selected persistent data to the user selected destination
112

FIG. 2A

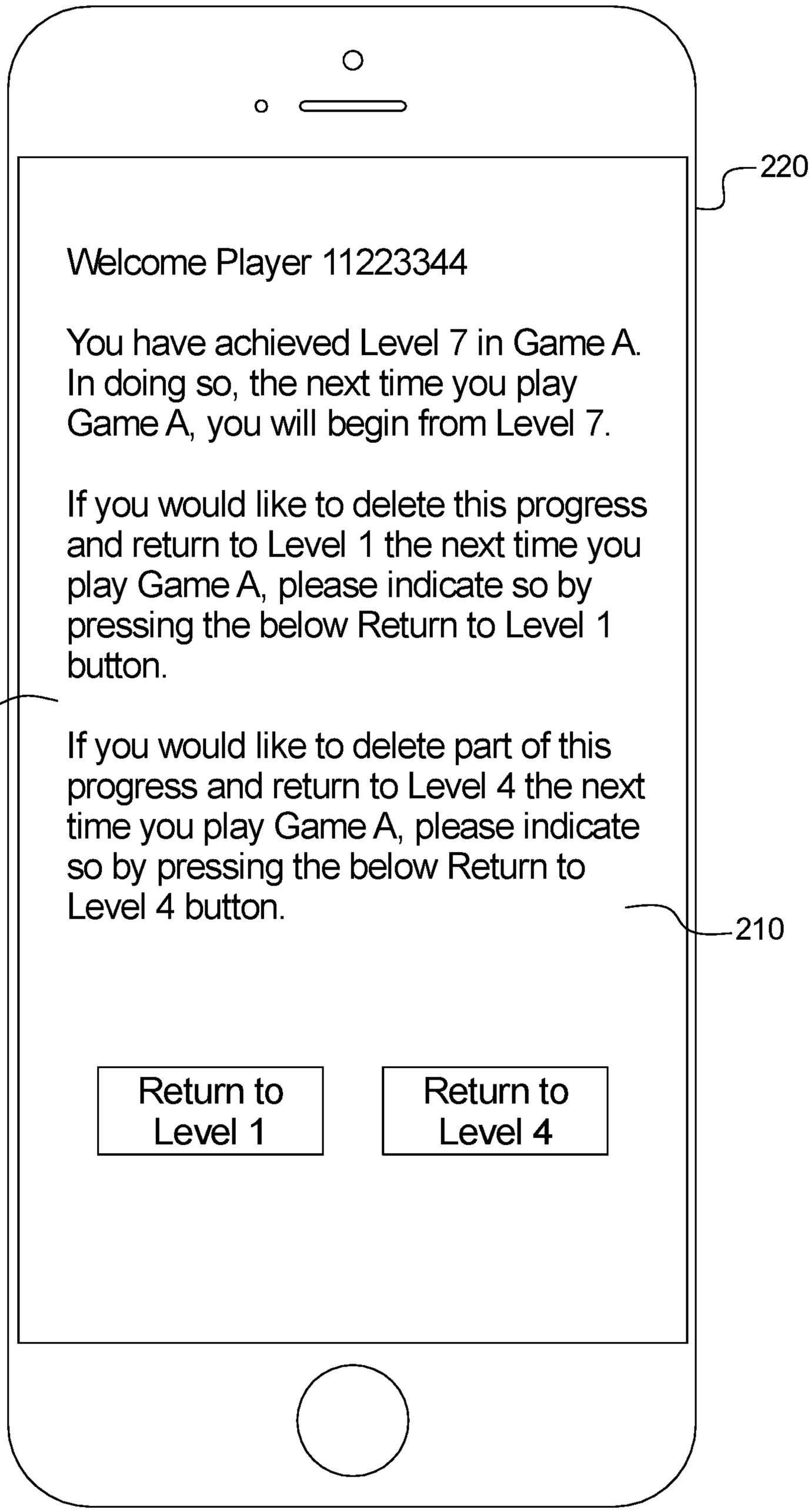
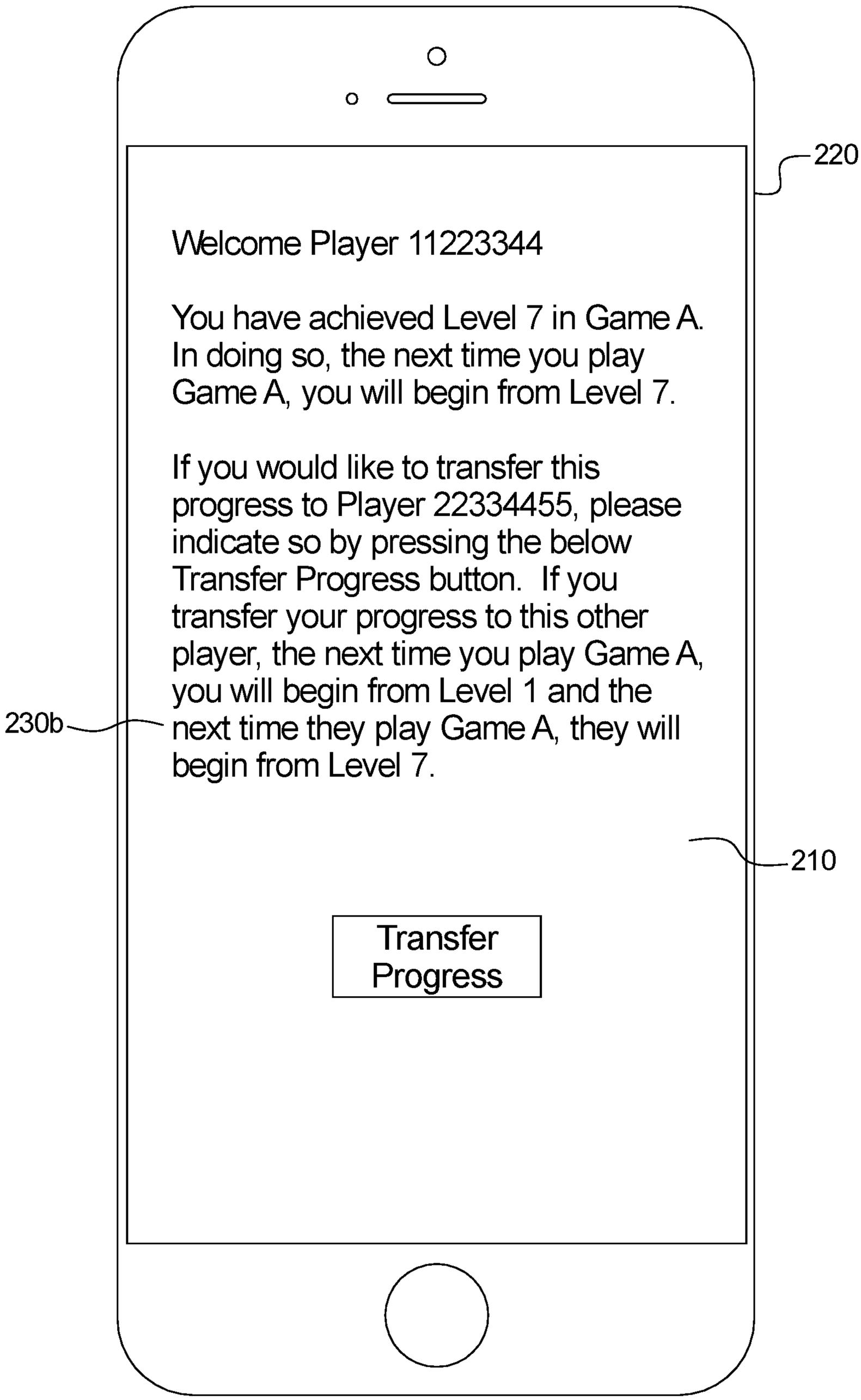

220
Welcome Player 11223344
You have achieved Level 7 in Game A. In doing so, the next time you play Game A, you will begin from Level 7.
If you would like to delete this progress and return to Level 1 the next time you play Game A, please indicate so by pressing the below Return to Level 1 button.
230a
If you would like to delete part of this progress and return to Level 4 the next time you play Game A, please indicate so by pressing the below Return to Level 4 button.
210
Return to Level 1
Return to Level 4

FIG. 2B


220
Welcome Player 11223344
You have achieved Level 7 in Game A. In doing so, the next time you play Game A, you will begin from Level 7.
If you would like to transfer this progress to Player 22334455, please indicate so by pressing the below Transfer Progress button. If you transfer your progress to this other player, the next time you play Game A, you will begin from Level 1 and the next time they play Game A, they will begin from Level 7.
230b
210
Transfer Progress

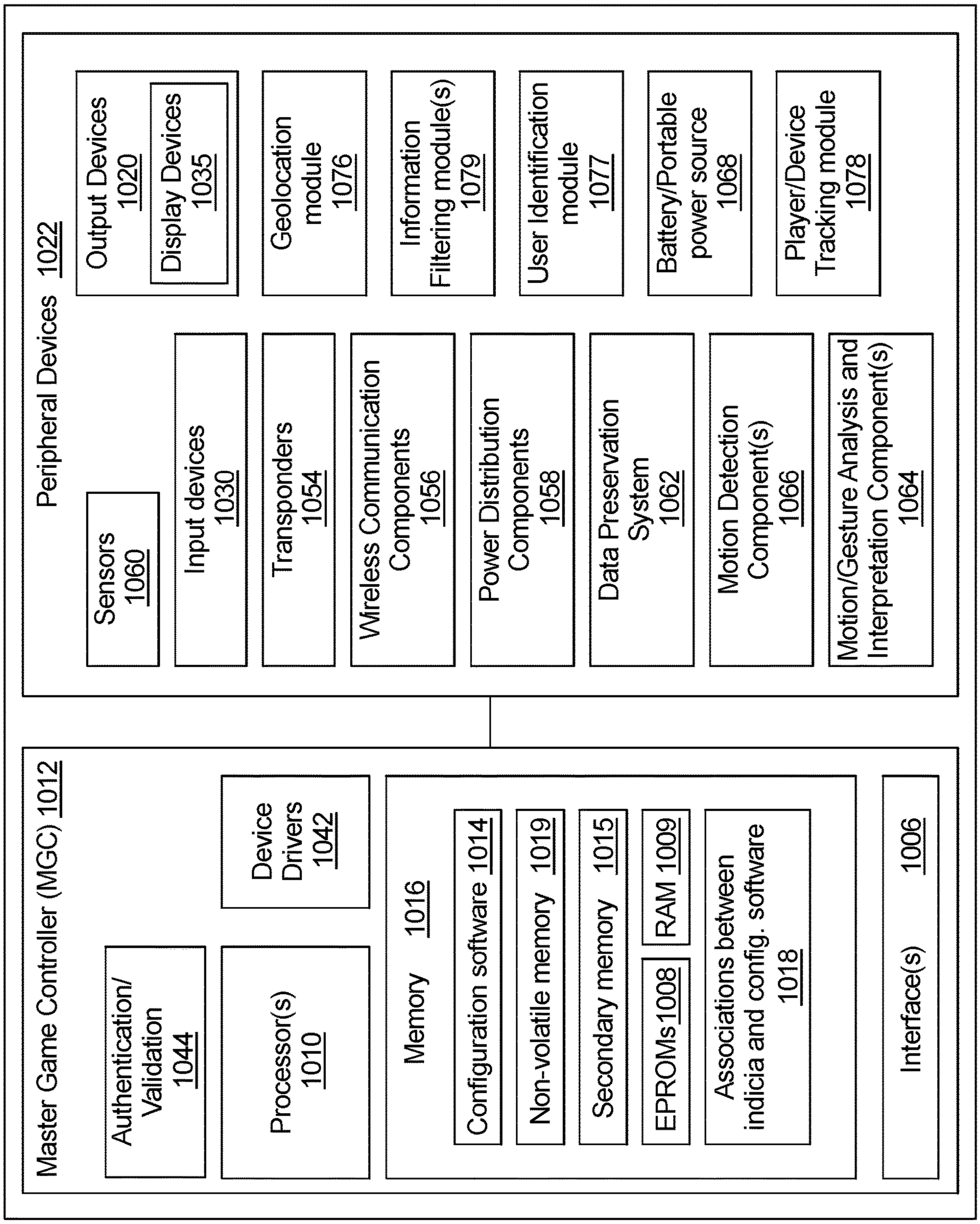
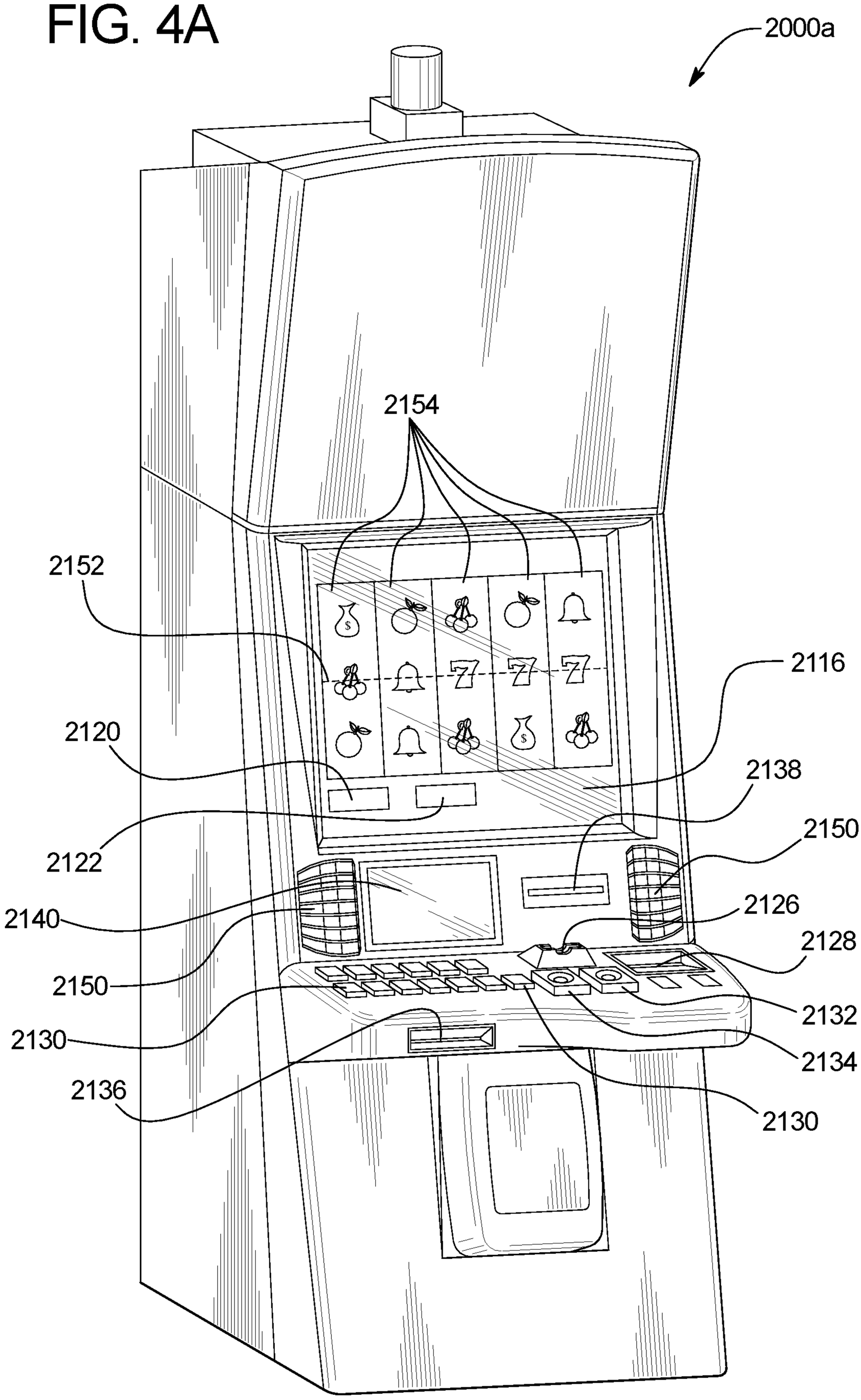

Master Game Controller (MGC) 1012
Authentication/ Validation 1044
Processor(s) 1010
Device Drivers 1042
Memory 1016
Configuration software 1014
Non-volatile memory 1019
Secondary memory 1015
EPROMs 1008
RAM 1009
Associations between indicia and config. software 1018
Interface(s) 1006
Peripheral Devices 1022
Sensors 1060
Input devices 1030
Transponders 1054
Wireless Communication Components 1056
Power Distribution Components 1058
Data Preservation System 1062
Motion Detection Component(s) 1066
Motion/Gesture Analysis and Interpretation Component(s) 1064
Output Devices 1020
Display Devices 1035
Geolocation module 1076
Information Filtering module(s) 1079
User Identification module 1077
Battery/Portable power source 1068
Player/Device Tracking module 1078
1000

FIG. 3

FIG. 4A


2000a
2154
2152
2116
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2130

FIG. 4B

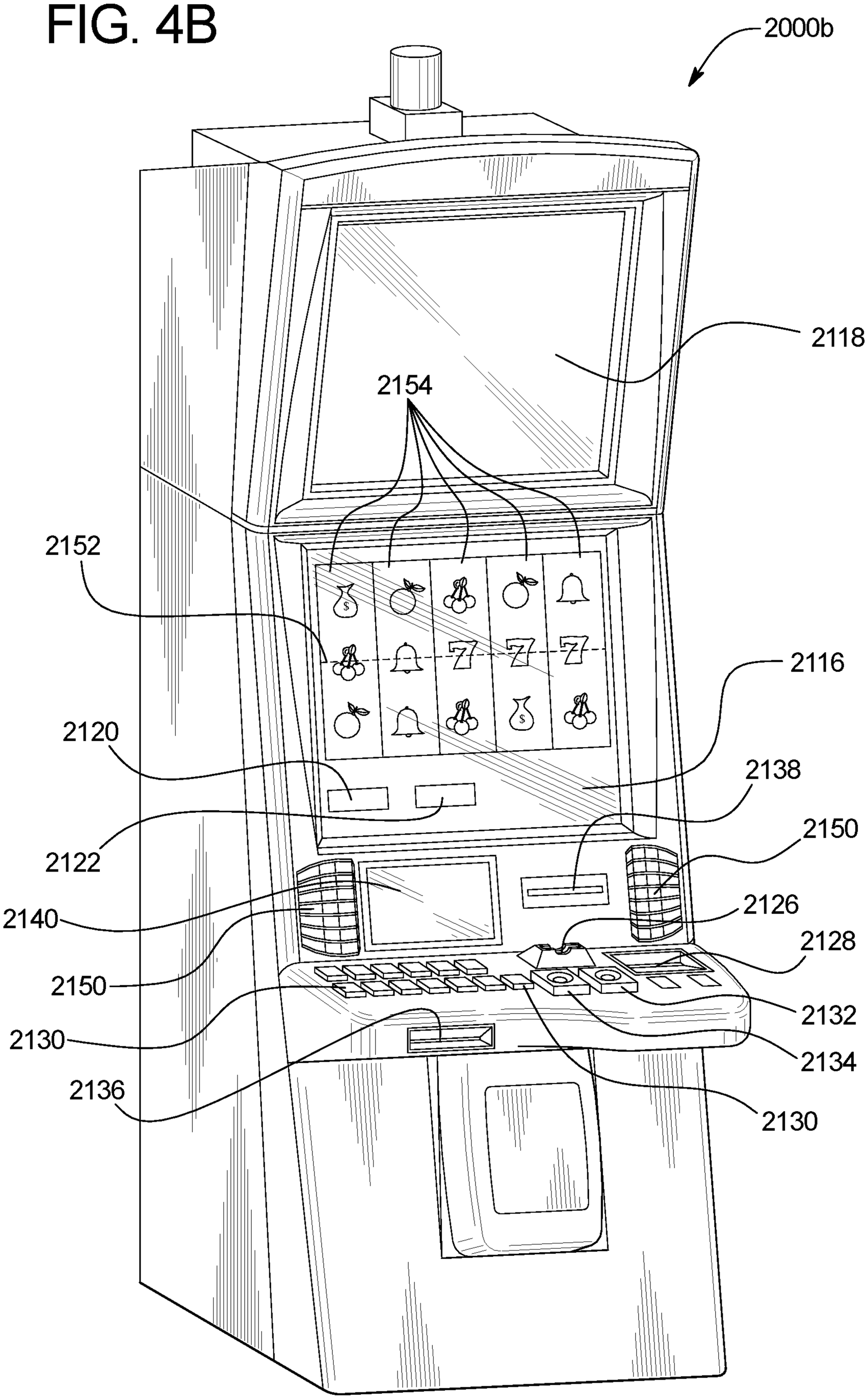
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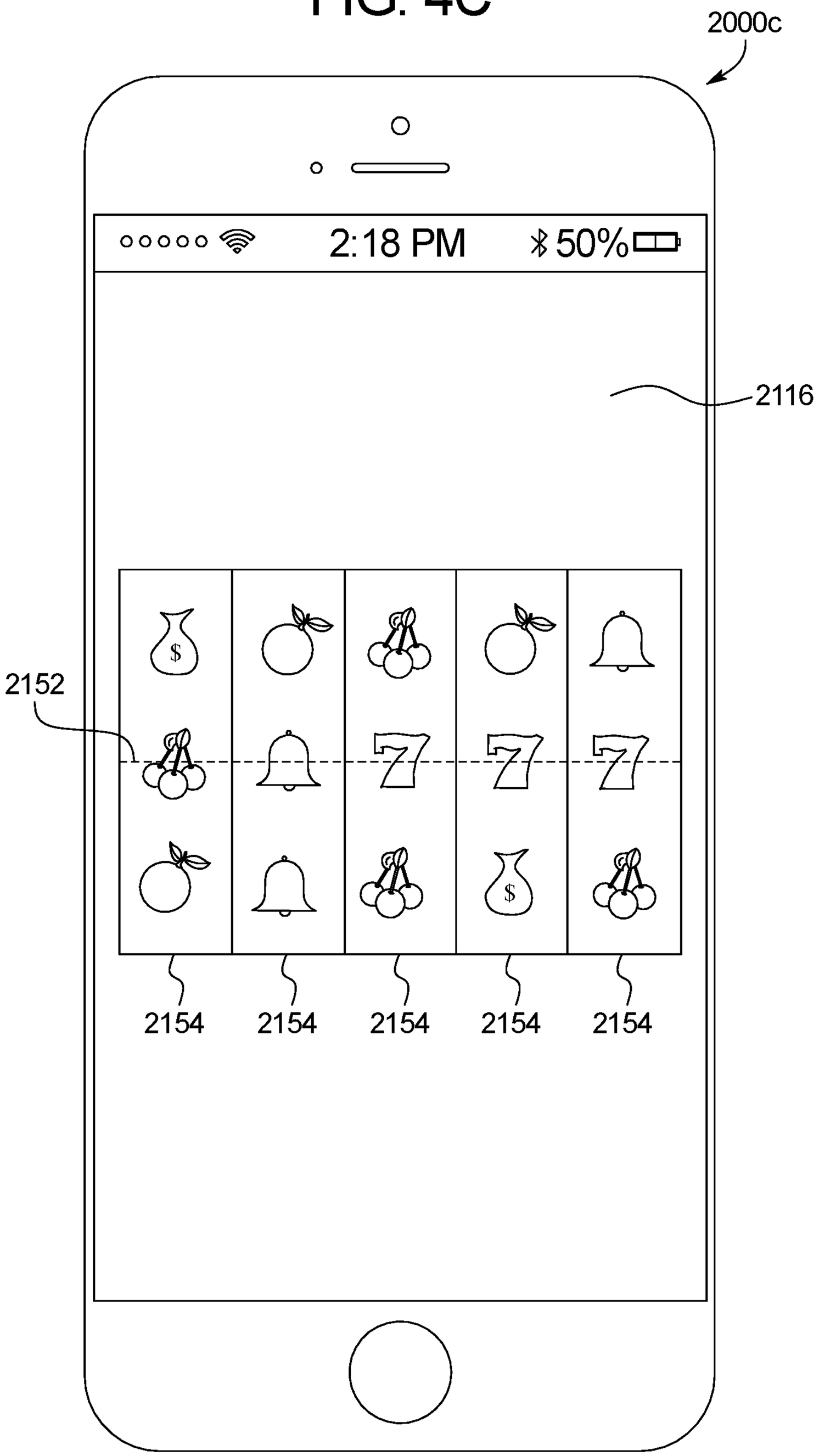
FIG. 4C



REMOTELY MANAGING PLAYER DATA

BACKGROUND

In various embodiments, the systems and methods of the present disclosure enable a user to manage persistent data associated with a user via a mobile device executing a mobile device application.

Gaming machines may provide players awards in primary games. Gaming machines generally require the player to place or make a wager to activate the primary or base game. The award may be based on the player obtaining a winning symbol or symbol combination and on the amount of the wager.

BRIEF SUMMARY

In certain embodiments, the present disclosure relates to a system including a processor, and a memory device that stores a plurality of instructions. When executed by the processor responsive to a receipt, from a mobile device executing a mobile device application, of first data associated with a first selection of persistent data associated with a user to manage, the instructions cause the processor to cause a first modification of the persistent data, wherein the persistent data comprises game state data. When executed by the processor responsive to a receipt, from the mobile device executing the mobile device application, of second data associated with a second, different selection of persistent data associated with the user to manage, the instructions cause the processor to cause a second, different modification of the persistent data associated with the user.

In certain embodiments, the present disclosure relates to a system including a processor, and a memory device that stores a plurality of instructions. When executed by the processor responsive to a receipt, from a mobile device executing a mobile device application, of first data associated with a selection to delete at least part of a saved progress of a game associated with a user, the instructions cause the processor to cause a deletion of the at least part of the saved progress of the game associated with the user. When executed by the processor responsive to a receipt, from the mobile device executing the mobile device application, of second data associated with a selection to transfer at least part of the saved progress of the game associated with the user to a destination, the instructions cause the processor to cause a transfer of the at least part of the saved progress of the game associated with the user to the destination.

In certain embodiments, the present disclosure relates to a method of operating a system. Responsive to a receipt, from a mobile device executing a mobile device application, of first data associated with a first selection of persistent data associated with a user to manage, the method includes causing, by a processor, a first modification of the persistent data, wherein the persistent data comprises game state data. Responsive to a receipt, from the mobile device executing the mobile device application, of second data associated with a second, different selection of persistent data associated with the user to manage, the method includes causing, by the processor, a second, different modification of the persistent data associated with the user.

Additional features are described herein, and will be apparent from the following Detailed Description and the figures.

BRIEF DESCRIPTION OF THE FIGURES

FIG. **1** is a flow chart an example process for operating a system of one embodiment of the present disclosure that enables a user to manage persistent data remote from any gaming machine.

FIGS. **2**A and **2**B are front views of one embodiment of the system of the present disclosure illustrating a mobile device displaying persistent data and enabling a user to modify the persistent data utilizing a mobile device application executed by the mobile device.

FIG. **3** is a schematic block diagram of one embodiment of an electronic configuration of an example gaming system of the present disclosure.

FIGS. **4**A and **4**B are perspective views of example alternative embodiments of an electronic gaming machine of the present disclosure.

FIG. **4**C is a front view of an example personal gaming device of the present disclosure.

DETAILED DESCRIPTION

In various embodiments, the systems and methods of the present disclosure enable a user, such as a player, to manage persistent data, such as game state data, remote from any electronic gaming machine, such as via a mobile device executing a mobile device application.

In certain embodiments, the systems and methods of the present disclosure employs a mobile device application executed by a mobile device to enable a user to access persistent data associated with the user, such as access game persistent data (e.g., a saved state of a game) associated with the user and/or user data (e.g., a status or level achieved by the user) associated with the user. In these embodiments, the access includes displaying persistent data, such as a saved state of a game played at an electronic gaming machine ("EGM"), to the user independent of any EGM where the user may continue the play of the game from the saved state. In certain embodiments, the systems and methods of the present disclosure additionally or alternatively employs the mobile device application executed by the mobile device to enable the user to modify persistent data associated with the user. In these embodiments, the modification includes deleting part or all of any persistent data associated with the user, such as a saved state of a game, independent of any EGM where such a state of the game was achieved and/or where the user may continue the play of the game from the saved state. Such a configuration of enabling a user to view and/or modify persistent data associated with the user independent of any EGM increases user mobility as users are no longer required to engage an EGM to gather information about any persistent data maintained on their behalf. Moreover, such access to certain types of data independent of any EGM fosters a more seamless experience for the users (whom such data pertains to) in the face of unknown regulatory environments and changing customer requirements.

In certain embodiments, the systems and methods of the present disclosure additionally or alternatively employs the mobile device application executed by the mobile device to enable the user to transfer persistent data associated with the user. In certain such embodiments, the transfer includes providing such persistent data to another user, such as enabling a first user to provide the state of a game associated with that first user to being associated with a second user not previously associated with the state of the game. In certain other embodiments, the transfer includes reassigning such persistent data from being associated with one gaming

establishment to being associated with another gaming establishment. In certain other embodiments, the transfer includes reassigning such persistent data from being associated with or otherwise usable for one type of game to being associated with or otherwise usable for another type of game. Such a configuration of enabling a user to transfer persistent data associated with the user from one association (e.g., a user, a gaming establishment, and/or a game) to another association (e.g., another user, another gaming establishment, and/or another game) creates an ecosystem independent of any EGM wherein one user's persistent data becomes an alternative form of currency utilized in certain transactions.

Accordingly, by enabling a user to employ a mobile device to manage persistent data associated with the user remote from any EGM where such persistent data was otherwise generated, the system harnesses the computing resources of the mobile device thereby alleviating the use of computing resources of various gaming establishment components previously tasked with maintaining such persistent data in association with such users. Moreover, by providing alternative avenues for users to interact with the system and control certain aspects of a user's persistent data without requiring the user to employ an EGM to facilitate such interactions, the system frees up EGM resources (e.g., reduced EGM operational time dedicated to the user employing one or more EGM interfaces to review and/or modify certain persistent data at the EGM) and enables the EGM to offer other services which better utilize the specialized hardware/software configuration of the EGM.

FIG. **1** is a flowchart of an example process or method of operating the system of the present disclosure. In various embodiments, the process is represented by a set of instructions stored in one or more memories and executed by one or more processors. Although the process is described with reference to the flowchart shown in FIG. **1**, many other processes of performing the acts associated with this illustrated process may be employed. For example, the order of certain of the illustrated blocks or diamonds may be changed, certain of the illustrated blocks or diamonds may be optional, or certain of the illustrated blocks or diamonds may not be employed.

In operation of this example embodiment, as indicated in block **102**, upon a persistent data generation event, the system generates persistent data associated with a user. In certain embodiments, a persistent data generation event occurs in association with a play of a primary game and/or a play of a secondary game. For example, a persistent data generation event occurs in association with a user, such as a player, reaching a designated level during a play of a game. In certain embodiments, a persistent data generation event occurs independent of any displayed event associated with any plays of any of primary games and/or any plays of any secondary games. For example, a persistent data generation event occurs in association with a user, such as a player, making one or more inputs associated with one or more user preferences.

In certain embodiments, a persistent data generation event occurs in association with one or more events occurring at an EGM. For example, a persistent data generation event occurs in association with a user, such as a player, obtaining a quantity of player tracking points at an EGM. In certain embodiments, a persistent data generation event occurs independent of any events occurring at any EGMs. For example, a persistent data generation event occurs in association with a user, such as a player, obtaining a quantity of virtual credits via an event occurring during a play of a game displayed by a personal gaming device, such as a mobile device.

In certain embodiments, the generated persistent data includes game persistent data including any data pertaining to one or more states of one or more different games based on an individual user's historical gameplay outcomes and activities. In these embodiments, the states of such games include different aspects of the game which persist or carry over from game play to game play (or gaming session to gaming session), such as, but not limited to: levels or scores obtained, features locked/unlocked, elements accumulated (e.g., symbols accumulated toward the activation of one or more game play features) and/or events tracked. It should be appreciated that in certain embodiments wherein a game includes both a monetary wagering version and a casual non-monetary wagering version, game persistent data is maintained for each of the respective versions of the game. In certain other embodiments wherein a game includes both a monetary wagering version and a casual non-monetary wagering version, game persistent data is collectively maintained for all of the versions of the game.

In certain embodiments, the generated persistent data includes user persistent data including any data pertaining to one or more user preferences either inputted by the user or detected based on the individual user's historical activities and/or persistent elements accumulated in association with the user (e.g., a quantity of player tracking points associated with a user). In these embodiments, the user preferences include, but are not limited to, how a user prefers a game is configured (e.g., wager options, denomination), how a user prefers game is displayed (e.g., use of specific symbols), a user's preferred service options (e.g., a preferred drink ordered through a service window), and/or how an EGM or personal gaming device is configured (e.g., volume level). It should be appreciated that in certain embodiments wherein a game includes both a monetary wagering version and a casual non-monetary wagering version, user data is maintained for each of the respective versions of the game. In certain other embodiments wherein a game includes both a monetary wagering version and a casual non-monetary wagering version, user data is collectively maintained for all of the versions of the game.

Following any generation of persistent data associated with a user, as indicated in block **104**, the system stores any persistent data currently associated with the user.

In certain embodiments, the system stores the persistent data currently associated with the user using one or more components of a gaming establishment management system, such as one or more servers of a player tracking system. In certain embodiments, the system additionally or alternatively stores the persistent data currently associated with the user using one or more EGMs. In certain embodiments, the system additionally or alternatively stores the persistent data currently associated with the user using one or more components independent of any gaming establishment management system, such as a server maintained by a third-party separate from the user and the gaming establishment.

In certain embodiments, the system additionally or alternatively stores the persistent data currently associated with the user using a mobile device associated with the user. It should be appreciated that rather than existing gaming establishment systems which collect, due to certain bandwidth issues, a relatively small amount of persistent data, the use of a mobile device to collect part or all of such persistent data increases the capacity of data collected by the system of the present disclosure. This increased capacity enables mul-

tiple different sets of persistent data to be simultaneously collected and managed by users associated with such persistent data. That is, by utilizing the alternative mobile device based network of the present disclosure to collect part or all of persistent data associated with a user, more persistent data may be able to be collected (compared to existing systems) which enables this additional persistent data to be managed (e.g., transferred) by users in ways previously unavailable.

In certain embodiments wherein the persistent data is generated at an EGM and stored by at least a mobile device, upon a pairing or linkage between the mobile device and the EGM (or a component of a gaming establishment management system, such as a slot machine interface board ("SMIB"), associated with the EGM), the EGM directly communicates the generated persistent data to the mobile device for storage. In certain embodiments wherein the persistent data is generated by a mobile device and stored by an EGM (and/or stored by a component of a gaming establishment management system), upon a pairing or linkage between the mobile device and the EGM (or a component of a gaming establishment management system associated with the EGM), the mobile device directly communicates the generated persistent data to the EGM (and/or the component of the gaming establishment management system) for storage.

In certain embodiments wherein the persistent data is generated at an EGM and stored by at least a mobile device, upon the mobile device communicatively connecting to a server which is in communication with the EGM (or a component of a gaming establishment management system associated with the EGM), the EGM indirectly communicates the generated persistent data to the mobile device for storage through the use of the server. In certain embodiments wherein the persistent data is generated by a mobile device and stored by an EGM (and/or stored by a component of a gaming establishment management system), upon the mobile device communicatively connecting to a server which is in communication with the EGM (or a component of a gaming establishment management system associated with the EGM), the mobile device indirectly communicates the generated persistent data to the EGM (and/or the component of the gaming establishment management system) for storage through the use of the server. In different embodiments, the mobile device communicatively connects to and communicates data with the EGM, the server and/or the component of the gaming establishment management system via any suitable wireless communication protocol, including, but not limited to: Bluetooth™, Bluetooth™ Low Energy ("BLE"), one or more cellular communication standards (e.g., 3G, 4G, 5G, LTE), one or more Wi-Fi compatible standards, and one or more short range communication protocols (e.g., a near field communication ("NFC") protocol).

In certain embodiments, the mobile device communicatively connects to the EGM, the server and/or the component of the gaming establishment management system when a particular mobile application—such as a mobile application associated with the gaming establishment—is launched on the mobile device. In one such embodiment, the mobile device application is a location based digital wallet enabled application, such as a Passbook-enabled or Wallet-enabled application, which is accessible to receive persistent data from an EGM when the user enters a gaming establishment. In another such embodiment, the mobile device application is downloaded to the mobile device from an application store regardless of the user being located in or otherwise associated with a gaming establishment. In another such embodiment, the mobile device application is downloaded to the mobile device from one or more websites or application stores affiliated with the gaming establishment (which are accessible directly by the user and/or by a link opened when the user scans a QR code associated with the gaming establishment) regardless of the user being located in or otherwise associated with a gaming establishment.

Following the storage of any persistent data currently associated with the user, the system determines if any inputs are made by the user to delete any of the persistent data currently associated with the user as indicated in diamond **106**. That is, in addition to periodically storing any persistent data associated with the user and making such persistent data available for the user to review, the system periodically determines if the user has made any inputs to cause a deletion of part or all of such stored persistent data.

If the system determines that one or more inputs were made by the user to delete part or all of the persistent data associated with the user, as indicated in block **108**, the system proceeds to delete the user selected persistent data. In certain embodiments, the system enables a user to utilize an interface remote from any EGM to manage the persistent data associated with the user by removing part or all of such persistent data. In such embodiments, following any deletion of any persistent data associated with the user, the system updates one or more databases to reflect the removal of such persistent data from being associated with the user.

In certain embodiments, the system enables the user to delete persistent data currently associated with the user via a mobile device application of a mobile device. For example, as seen in FIG. **2**A, if the system is currently storing a state of a game played by the user (e.g., Player ID 11223344 has achieved Level 7 of Game A) as persistent data associated with that user and the user wants to start over from the beginning of the game or return to a previous level of the game, a mobile device application **210** being executed by a mobile device **220** displays one or more messages to the user enabling the user to make one or more inputs to manage the persistent data by deleting part or all of the stored state of the game **230***a*. In these embodiments, following any user inputs received by the mobile device application associated with deleting any persistent data, the mobile device communicates data associated with which persistent data is to be deleted to one or more components of the system tasked with maintaining the persistent data associated with the user (which such components proceed to delete part or all of the persistent data associated with the user responsive to the communication from the mobile device).

In certain embodiments, the system enables the user to delete persistent data currently associated with the user via the user logging into a website that displays persistent data associated with the user. In these embodiments, upon the user accessing the website using a web browser (and/or a mobile device application) and making one or more inputs associated with deleting any persistent data, the web server that maintains the website communicates data associated with which persistent data is to be deleted to one or more components of the system tasked with maintaining the persistent data associated with the user (which such components proceed to delete part or all of the persistent data associated with the user responsive to the communication from the web server).

It should be appreciated that enabling a user to delete part or all of any persistent data associated with the user, such as a saved state of a game, independent of any EGM where such a state of the game was achieved and/or where the user

may continue the play of the game from the saved state increases user mobility as users are no longer required to engage an EGM to manage any persistent data maintained on their behalf. Moreover, such access to certain types of data independent of any EGM fosters a more seamless experience for the users (whom such data pertains to) in the face of unknown regulatory environments and changing customer requirements.

Returning to FIG. **1**, following the deletion of any persistent data currently associated with the user or upon a determination that no inputs were made by the user to delete any of the persistent data associated with the user, the system determines if any inputs are made by the user to transfer any of the persistent data currently associated with the user to a user selected destination as indicated in diamond **110**. That is, in addition to periodically storing any persistent data associated with the user and periodically determining if the user has made any inputs to cause a deletion of part or all of such stored persistent data, the system periodically determines if the user has made any inputs to transfer (or otherwise share) part or all of such stored persistent data from being associated with the user to being associated with a destination selected by the user.

If the system determines that one or more inputs were made by the user to transfer part or all of the persistent data associated with the user to a destination, as indicated in block **112**, the system proceeds to transfer the user selected persistent data to the user selected destination. In certain embodiments, the system enables a user to utilize an interface remote from any EGM to manage the persistent data associated with the user by selecting a destination to transfer persistent data to and/or selecting which persistent data currently associated with the user should be transferred. In such embodiments, following any transfer of any persistent data associated with the user to a destination, the system updates one or more databases to reflect the removal of such persistent data from being associated with the user and the addition of such persistent data to being associated with the destination.

In certain embodiments, the system enables the user currently associated with persistent data to select another user as the destination for part or all of the persistent data. Following the selection of another user to transfer the selected persistent data to, the system operates to update one or more databases to reflect the removal of such transferred persistent data from being associated with the user and the addition of such transferred persistent data to being associated with the selected other user. In one example embodiment, the system enables a first user whom is associated with a saved state of a game (i.e., the persistent data) to make one or more inputs via a suitable interface to select a second user, such as a family member of the first user, to transfer the saved state of the game. In this example embodiment, following a completion of the transfer, the first user is no longer associated with the saved state of the game but rather the second user is now associated with the saved state of the game, such that the second user may proceed with the play of the game from the saved state of the game transferred from the first player. In one example of transferring persistent data from one player to another player, following a first player accumulating a first quantity of persistent elements over one or more plays of a game, the system stores such accumulated persistent elements in association with the first player and further enables the first player to interface with the system to select a second player (or a combination of multiple second players) to receive such accumulated persistent elements (or a selected subset of such accumulated persistent elements). In this example, following the first player interfacing with the system remote from any EGM to initiate a transfer, the system operates to transfer the accumulated persistent elements to the second player such that after the transfer, the first player is no longer associated with the accumulated persistent elements and the second player is associated with (and thus free to redeem) the persistent element accumulated by the first player.

In certain embodiments, the system enables the user currently associated with persistent data to select another game as the destination for part or all of the persistent data. Following the selection of another game to transfer the selected persistent data to, the system operates to update one or more databases to reflect the removal of such transferred persistent data from being associated with the user in association with one game and the addition of such transferred persistent data to being associated with the user in association with another game. In certain such embodiments, the system enables a user whom is associated with a saved state of a first game (i.e., the persistent data) to make one or more inputs via a suitable interface to select a second game, such as a different type of game from the first game and/or a different themed game from the first game, to transfer the saved state of the first game wherein following a completion of the transfer, the user is no longer associated with the saved state of the first game but rather the user is now associated with the saved state of the second game. For example, following a player reaching a designated level of a first multi-level game, the system stores data associated with the player reaching that designated level of the first multi-level game in association with the player and further enables the player to interface with the system to select a second, different multi-level game to transfer the reached designated level to. In this example, following the player interfacing with the system remote from any EGM to initiate the transfer, the system operates to transfer the reached designated level from the first multi-level game to the second, different multi-level game such that after the transfer, the player may no longer continue the first multi-level game from the designated level but rather may continue the second, different multi-level game from the designated level.

In certain embodiments, the system enables the user currently associated with persistent data obtained at one gaming establishment to select another gaming establishment as the destination for part or all of the persistent data. Following the selection of another gaming establishment to transfer the selected persistent data to, the system operates to update one or more databases to reflect the removal of such transferred persistent data from being associated with the user in association with one gaming establishment and the addition of such transferred persistent data to being associated with the user in association with another gaming establishment. In certain such embodiments, the system enables a user whom is currently associated with persistent data associated with a first gaming establishment to make one or more inputs via a suitable interface to select a second gaming establishment to transfer the persistent data to wherein following a completion of the transfer, the user is no longer associated with the persistent data in association with the first gaming establishment but rather the user is now associated with the persistent data in association with the second gaming establishment such that the user may utilize the persistent data in association with the second gaming establishment. For example, following a player accumulating a quantity of virtual credits associated with a first gaming establishment, the system stores data associated with the virtual credits associated with the first gaming establishment

and further enables the player to interface with the system to select a second, different gaming establishment to transfer the virtual credits to. In this example, following the player interfacing with the system remote from any EGM to initiate the transfer, the system operates to transfer the virtual credits from being associated with the player in association with the first gaming establishment to being associated with the player in association with the second gaming establishment such that after the transfer, the player may no longer redeem the virtual credits with the first gaming establishment but may now redeem the virtual credits with the second gaming establishment.

In certain embodiments, the system enables the user currently associated with persistent data obtained at one entity (e.g., a corporate entity and the various children entities including zero, one or more gaming establishment brands and zero, one or more gaming establishment venues having one or more EGMs and/or being associated with one or more personal gaming devices that are associated with that corporate entity) to select another game (and/or another user) associated with another entity as the destination for part or all of the persistent data. Following the selection of another entity to transfer the selected persistent data to, the system operates to update one or more databases to reflect the removal of such transferred persistent data from being associated with the user in association with one entity and the addition of such transferred persistent data to being associated with the user (or another user) in association with another entity. For example, following a player entering one or more player preferences associated with a first entity, the system stores data associated with the player preferences associated with the first entity and further enables the player to interface with the system to select a second, different entity to transfer the player preferences to. In this example, following the player interfacing with the system remote from any EGM to initiate the transfer, the system operates to transfer the player preferences from being associated with the player in association with the first entity to being associated with the player in association with the second entity such that after the transfer, the player preferences are available for the player to utilize in association with the second entity.

In certain embodiments, the system employs multiple destinations in association with a transfer of persistent data. For example, the system enables a first user associated with a first gaming establishment to select a second user associated with a second gaming establishment as the destination for part or all of the persistent data of the first user. In certain embodiments, the system enables a user to select multiple destinations to transfer persistent data to. For example, the system enables a first user to select multiple other users to transfer persistent data associated with the first user to each of.

In certain embodiments, when transferring persistent data from one user to another user (and/or from one game to another game), the system modifies the transferred persistent data to account for the destination of the persistent data. In these embodiments, since one or more parameters of the destination for the persistent data may differ from one or more parameters of the source of the persistent data, the system normalizes such transferred persistent data to account for these differences. For example, if a player whom has reached a tenth level of a first game attempts to utilize a mobile device application to facilitate a transfer the state of that first game to a second game, the system accounts for the different paytables employed by the different games and modifies the persistent data transferred such that the tenth level of the first game equates to the seventh level of the second game. In another example, if a player whom has obtained a first quantity of playing tracking points associated with a first gaming establishment attempts to utilize a mobile device application to facilitate a transfer of the first quantity of player tracking points to a second gaming establishment, the system accounts for the different player tracking point currency conversions of the two gaming establishments and modifies the persistent data transferred such that the first quantity of player tracking points associated with the first gaming establishment equates to a second, different quantity of player tracking points associated with the second gaming establishment. In certain embodiments, when transferring persistent data from one user to another user (and/or from one game to another game), the system does not modify the transferred persistent data to account for the destination of the persistent data and rather transfers the persistent data as is.

In certain embodiments, the system enables the user to transfer persistent data currently associated with the user to a user selected destination via a mobile device application of a mobile device. For example, as seen in FIG. **2**B, if the system is currently storing a state of a game played by the user (e.g., Player ID 11223344 has achieved Level 7 of Game A) as persistent data associated with that user and the user wants to transfer the achieved Level 7 to another player playing another game, the mobile device application **210** being executed by the mobile device **220** displays one or more messages to the user enabling the user to make one or more inputs to manage the persistent data by transferring the achieved Level 7 from Game A to a second player (e.g., Player ID 22334455) playing Game B **230***b*. In these embodiments, following any user inputs received by the mobile device application associated with transferring any persistent data, the mobile device communicates data associated with which persistent data is to be transferred to one or more components of the system tasked with maintaining the persistent data associated with the user (which such components proceed to transfer part or all of the persistent data associated with the user responsive to the communication from the mobile device).

In certain embodiments, the system enables the user to transfer persistent data currently associated with the user via the user logging into a website that displays the persistent data associated with the user. In these embodiments, upon the user accessing the website using a web browser (and/or a mobile device application) and making one or more inputs associated with which persistent data to transfer to which destination, the web server that maintains the website communicates data associated with which persistent data is to be transferred to which destination to one or more components of the system tasked with maintaining the persistent data associated with the user (which such components proceed to transfer part or all of the persistent data associated with the user responsive to the communication from the web server).

Returning to FIG. **1**, following the transfer of any persistent data currently associated with the user to a user selected destination or upon a determination that no inputs were made by the user to transfer any of the persistent data associated with the user to any destination, the system returns to block **104** and continues to store any persistent data currently associated with the user.

It should thus be appreciated that by enabling a user to employ a mobile device to manage persistent data associated with the user remote from any EGM where such persistent data was otherwise generated, the system harnesses the computing resources of the mobile device thereby alleviat-

ing the use of computing resources of various gaming establishment components previously tasked with maintaining such persistent data in association with such users. Moreover, by providing alternative avenues for users to interact with the system and control certain aspects of a user's persistent data without requiring the user to employ an EGM to facilitate such interactions, the system frees up EGM resources (e.g., reduced EGM operational time dedicated to the user employing one or more EGM interfaces to review and/or modify certain persistent data at the EGM) and enables the EGM to offer other services which better utilize the specialized hardware/software configuration of the EGM.

In certain embodiments, the system enables any user the option of managing persistent data associated with that user. In certain embodiments, the system enables designated users the option of managing persistent data associated with that user (and disables such an option for non-designated users). In one such embodiment, the system enables users associated with a player tracking account the option of managing persistent data associated with that user (and disables users not associated with a player tracking account from managing persistent data associated with that user). In another such embodiment, the system enables users associated with a player tracking account having a player tracking status above a designated level the option of managing persistent data associated with that user (and disables users not associated with a player tracking account or associated with a player tracking account having a player tracking status below the designated level from managing persistent data associated with that user). In another such embodiment, the system enables users associated with a designated amount of historic wagering activity (e.g., historic wagering game activity and/or historic sporting event wagering activity) the option of managing persistent data associated with that user (and disables users not associated with the designated amount of historic wagering activity from managing persistent data associated with that user).

In certain embodiments, the system charges a fee to a user to manage persistent data associated with that user. In one such embodiment, the system charges the same fee to each user. In another such embodiment, the system charges different fees for different users, wherein such fees for each user are based on one or more identifying factors (e.g., player tracking status and/or historic wagering activity) of that user. In certain embodiments, the system enables a user to manage persistent data associated with that user as a courtesy.

In certain embodiments, the generated persistent data includes game persistent data associated with one or more games played. In these embodiments, the system enables a user to manage persistent data associated with different games played in different gaming environments. In one such embodiment, one of the games played in which persistent data becomes associated with the user includes a wagering game associated with monetary awards played at an EGM of a gaming establishment upon a placement of a monetary wager. In another such embodiment, one of the games played in which persistent data becomes associated with the user includes a wagering game associated with monetary awards played at an EGM of a gaming establishment upon a placement of a non-monetary wager. In another such embodiment, one of the games played in which persistent data becomes associated with the user includes a wagering game associated with non-monetary awards played at an EGM of a gaming establishment upon a placement of a non-monetary wager. In another such embodiment, one of the games played in which persistent data becomes associated with the user includes a bonus or secondary game associated with monetary awards played at an EGM of a gaming establishment upon a secondary game triggering event. In another such embodiment, one of the games played in which persistent data becomes associated with the user includes a bonus or secondary game associated with non-monetary awards played at an EGM of a gaming establishment upon a secondary game triggering event.

In another such embodiment, one of the games played in which persistent data becomes associated with the user includes a social or casual game associated with non-monetary awards played at an EGM of a gaming establishment. In another such embodiment, one of the games played in which persistent data becomes associated with the user includes a social or casual game associated with non-monetary awards played remote from any EGM of any gaming establishment (e.g., a social or casual game played in association with a mobile device). In certain embodiments, the system enables a user to play a casual or social game in conjunction with the play of a wagering game. In one such embodiment, the casual or social game is a secondary game which is launched or otherwise triggered from the play of a wagering game. In another embodiment, the system enables a user to play a casual or social game independent of the play of a wagering game. In one such embodiment, the casual or social game is launched or otherwise triggered apart from the play of the wagering game. Such a configuration enables a user to participate in the play of the casual or social game remote from a wagering game EGM located at a gaming establishment, and thus enables the user to continue their gaming experience in a different gaming format.

It should be appreciated that the game persistent data associated any suitable game that may be managed by the user includes any wagering game and/or social or casual game including, but not limited to: a play of any suitable slot game; a play of any suitable wheel game; a play of any suitable card game; a play of any suitable offer and acceptance game; a play of any suitable award ladder game; a play of any suitable puzzle-type game; a play of any suitable persistence game; a play of any suitable selection game; a play of any suitable cascading symbols game; a play of any suitable ways to win game; a play of any suitable scatter pay game; a play of any suitable coin-pusher game; a play of any suitable elimination game; a play of any suitable stacked wilds game; a play of any suitable trail game; a play of any suitable bingo game; a play of any suitable video scratch-off game; a play of any suitable pick-until-complete game; a play of any suitable shooting simulation game; a play of any suitable racing game; a play of any suitable promotional game; a play of any suitable high-low game; a play of any suitable lottery game; a play of any suitable number selection game; a play of any suitable dice game; a play of any suitable skill game; a play of any suitable matching game; a play of any suitable augmented reality game; a play of any suitable auction game; a play of any suitable reverse-auction game; and/or a play of any suitable group game. It should be appreciated that while certain games which persistent data associated with a user may be managed by the user are described as being played at EGMs at land-based gaming establishments, such games include games played upon the wagering of monetary credits and/or for monetary credit awards in association with an online gaming establishment or online casino that permits such monetary credit game play. As such, the present disclosure provides a mixed channel environment wherein different players utilizing dif-

ferent gaming platforms powered via different gaming system components participate in one or more wagering games and/or social or casual games wherein different persistent data is utilized between the different channels.

In certain embodiments, the generated persistent data includes game persistent data associated with one or more tracked events. In different embodiments, the events which occur in association with one or more plays of one or more games and which are tracked as persistent data include, but are not limited to: a placement of a wager (regardless of the wager amount); a placement of a side-wager (regardless of the side-wager amount); a wager on a number of paylines; a wager on a designated payline; a wager on a number of ways to win; a speed of play by a user; a change in a speed of play by a user; a betting pattern by a user; a change in betting pattern by a user; a change in a type of game played; an activation of a reel; a stopping of a reel, an activation of a plurality of reels; a stopping of a plurality of reels, a generation of any outcome (or a designated outcome); a generation of any outcome (or a designated outcome) associated with an award; a generation of any outcome (or a designated outcome) associated with an award over a designated value; a generation of an outcome on a designated payline; a generation of an outcome in a scatter configuration; a generation of a winning way to win; a generation of a designated symbol or symbol combination; a generation of a designated symbol or symbol combination on a designated payline; a generation of a designated symbol or symbol combination in a scatter configuration; a payment of an award amount; a triggering of a play of a secondary game; an activation of a secondary display; an activation of a community award generator; and/or a generation of any outcome (or a designated outcome) in a secondary game.

In certain embodiments, the generated persistent data includes game persistent data associated with one or more features. In these embodiments wherein persistent data associated with a user is managed by the user pertains to progress toward activating or otherwise unlocking one or more features, such features include, but are not limited to: a wild symbols feature; a book-end wild symbols feature; a stacked wild symbols feature; an expanding wild symbols feature; a wild reel feature; a retrigger symbol feature; an anti-terminator symbol feature; locking reel feature, a locking symbol position feature; a modifier, such as a multiplier, feature; a feature modifying an amount of credits of a credit balance; a feature modifying an amount of promotional credits; a feature modifying a placed wager amount; a feature modifying a placed side wager amount; a feature modifying a rate of earning player tracking points; a feature modifying a number of wagered on paylines; a feature modifying a wager placed on one or more paylines (or on one or more designated paylines); a feature modifying a number of ways to win wagered on; a feature modifying a wager placed on one or more ways to win (or on one or more designated ways to win); a feature modifying a paytable utilized for a play of a game; a feature modifying an average expected payback percentage of a play of a game; a feature modifying an average expected payout of a play of a game; a feature modifying one or more awards available; a feature modifying a range of awards available; a feature modifying a type of awards available; a feature modifying one or more progressive awards; a feature modifying which progressive awards are available to be won; a feature modifying one or more modifiers, such as multipliers, available; a feature modifying an activation of a reel (or a designated reel); a feature modifying an activation of a plurality of reels; a feature modifying a generated outcome (or a designated generated outcome); a feature modifying a generated outcome (or a designated generated outcome) associated with an award over a designated value; a feature modifying a generated outcome (or a designated generated outcome) on a designated payline; a feature modifying a generated outcome (or a designated generated outcome) in a scatter configuration; a feature modifying a winning way to win (or a designated winning way to win); a feature modifying a designated symbol or symbol combination; a feature modifying a generation of a designated symbol or symbol combination on a designated payline; a feature modifying a generation of a designated symbol or symbol combination in a scatter configuration; a feature modifying a triggering event of a play of a secondary or bonus game; a feature modifying an activation of a secondary or bonus display (such as an award generator); a feature modifying a quantity of activations of a secondary or bonus display (e.g., a feature modifying a quantity of spins of an award generator); a feature modifying a quantity of sections of a secondary or bonus display (e.g., a feature modifying a quantity of sections of an award generator); a feature modifying one or more awards of a secondary or bonus display; a feature modifying an activation of a community award generator; a feature modifying a quantity of activations of a community award generator; a feature modifying a quantity of sections of a community award generator; a feature modifying one or more awards of a community award generator; a feature modifying a generated outcome (or a designated generated outcome) in a secondary game; a feature modifying a quantity of picks in a selection game; a feature modifying a quantity of offers in an offer and acceptance game; a feature modifying a quantity of moves in a trail game; a feature modifying an amount of free spins provided; a feature modifying a game terminating or ending condition; a feature modifying how one or more aspects of one or more games (e.g., colors, speeds, sound) are displayed to a user; a feature modifying a player's wagering game avatar; and/or a feature modifying any game play feature associated with any play of any game of the present disclosure.

In different embodiments, the persistent data associated with a user manageable by the user includes a user's progress toward winning one or more awards that include one or more of: a quantity of monetary credits; a quantity of non-monetary credits; a quantity of promotional credits; a quantity of player tracking points; a progressive award; a modifier, such as a multiplier; a quantity of free plays of one or more games; a quantity of plays of one or more secondary or bonus games; a multiplier of a quantity of free plays of a game; one or more lottery based awards, such as lottery or drawing tickets; a wager match for one or more plays of one or more games; an increase in the average expected payback percentage for one or more plays of one or more games; one or more comps, such as a free dinner, a free night's stay at a hotel; a high value product such as a free car; a low value product; one or more bonus credits usable for online play; a lump sum of player tracking points or credits; a multiplier for player tracking points or credits; an increase in a membership or player tracking level; one or more coupons or promotions usable within and/or outside of the gaming establishment; virtual goods associated with the system; virtual goods not associated with the system; and/or an access code usable to unlock content on an internet.

It should be appreciated that in different embodiments, one or more of:

i. whether to save any persistent data associated with a user;

ii. which persistent data will be saved in association with a user;

iii. which persistent data will not be saved in association with a user;

iv. whether to delete any persistent data associated with a user;

v. which persistent data will be deleted in association with a user;

vi. which persistent data will not be deleted in association with a user;

vii. whether to transfer any persistent data associated with a user;

viii. a transfer destination of any persistent data associated with a user

ix. which persistent data will be transferred in association with a user;

x. which persistent data will not be transferred in association with a user; and/or

xi. any determination of the present disclosure;

is/are predetermined, randomly determined, randomly determined based on one or more weighted percentages, determined based on a generated symbol or symbol combination, determined independent of a generated symbol or symbol combination, determined based on a random determination by a server, determined independent of a random determination by a server, determined based on a random determination at the gaming system, determined independent of a random determination at the gaming system, determined based on at least one play of at least one game, determined independent of at least one play of at least one game, determined based on a player's selection, determined independent of a player's selection, determined based on one or more inputs from a system operator, determined independent of any inputs from a system operator, determined based on one or more side wagers placed, determined independent of one or more side wagers placed, determined based on the player's primary game wager, determined independent of the player's primary game wager, determined based on time (such as the time of day), determined independent of time (such as the time of day), determined based on an amount of coin-in accumulated in one or more pools, determined independent of an amount of coin-in accumulated in one or more pools, determined based on a status of the player (i.e., a player tracking status), determined independent of a status of the player (i.e., a player tracking status), determined based on one or more other determinations of the present disclosure, determined independent of any other determination of the present disclosure or determined based on any other suitable method or criteria.

It should be appreciated that the above-described embodiments of the present disclosure may be implemented in accordance with or in conjunction with one or more of a variety of different types of gaming systems. The present disclosure contemplates a variety of different gaming systems each having one or more of a plurality of different features, attributes, or characteristics. A "gaming system" as used herein refers to various configurations of: (a) one or more servers; (b) one or more electronic gaming machines such as those located on a casino floor; and/or (c) one or more personal gaming devices, such as desktop computers, laptop computers, tablet computers or computing devices, personal digital assistants, mobile phones, and other mobile computing devices. Thus, in various embodiments, the gaming system of the present disclosure includes: (a) one or more electronic gaming machines in combination with one or more servers; (b) one or more personal gaming devices in combination with one or more servers; (c) one or more personal gaming devices in combination with one or more electronic gaming machines; (d) one or more personal gaming devices, one or more electronic gaming machines, and one or more servers in combination with one another; (e) a single electronic gaming machine; (f) a plurality of electronic gaming machines in combination with one another; (g) a single personal gaming device; (h) a plurality of personal gaming devices in combination with one another; (i) a single server; and/or (j) a plurality of servers in combination with one another. For brevity and clarity and unless specifically stated otherwise, the term "EGM" is used herein to refer to an electronic gaming machine (such as, but not limited to, a slot machine, a video poker machine, a video lottery terminal, a terminal associated with an electronic table game, a terminal associated with a game played at a gaming table, a video keno machine, a video bingo machine and/or a sports betting terminal (that offers sports betting opportunities and, in certain instances, wagering games). Additionally, for brevity and clarity and unless specifically stated otherwise, "EGM" as used herein represents one EGM or a plurality of EGMs, "personal gaming device" as used herein represents one personal gaming device or a plurality of personal gaming devices, and "server" as used herein represents one server or a plurality of servers.

As noted above, in various embodiments, the gaming system includes an EGM (or personal gaming device) in combination with a server. In such embodiments, the EGM (or personal gaming device) is configured to communicate with the server through a data network or remote communication link. In certain such embodiments, the EGM (or personal gaming device) is configured to communicate with another EGM (or personal gaming device) through the same data network or remote communication link or through a different data network or remote communication link. For example, the gaming system includes a plurality of EGMs that are each configured to communicate with a server through a data network. In certain embodiments in which the gaming system includes an EGM (or personal gaming device) in combination with a server, the server is any suitable computing device (such as a server) that includes at least one processor and at least one memory device or data storage device. As further described herein, the EGM (or personal gaming device) includes at least one EGM (or personal gaming device) processor configured to transmit and receive data or signals representing events, messages, commands, or any other suitable information between the EGM (or personal gaming device) and the server. The at least one processor of that EGM (or personal gaming device) is configured to execute the events, messages, or commands represented by such data or signals in conjunction with the operation of the EGM (or personal gaming device). Moreover, the at least one processor of the server is configured to transmit and receive data or signals representing events, messages, commands, or any other suitable information between the server and the EGM (or personal gaming device). The at least one processor of the server is configured to execute the events, messages, or commands represented by such data or signals in conjunction with the operation of the server. One, more than one, or each of the functions of the server may be performed by the at least one processor of the EGM (or personal gaming device). Further, one, more than one, or each of the functions of the at least one processor of the EGM (or personal gaming device) may be performed by the at least one processor of the server.

In certain such embodiments, computerized instructions for controlling any games (such as any primary or base

games and/or any secondary or bonus games) displayed by the EGM (or personal gaming device) are executed by the server. In such "thin client" embodiments, the server remotely controls any games (or other suitable interfaces) displayed by the EGM (or personal gaming device), and the EGM (or personal gaming device) is utilized to display such games (or suitable interfaces) and to receive one or more inputs or commands. In other such embodiments, computerized instructions for controlling any games displayed by the EGM (or personal gaming device) are communicated from the server to the EGM (or personal gaming device) and are stored in at least one memory device of the EGM (or personal gaming device). In such "thick client" embodiments, the at least one processor of the EGM (or personal gaming device) executes the computerized instructions to control any games (or other suitable interfaces) displayed by the EGM (or personal gaming device).

In various embodiments in which the gaming system includes a plurality of EGMs (or personal gaming devices), one or more of the EGMs (or personal gaming devices) are thin client EGMs (or personal gaming devices) and one or more of the EGMs (or personal gaming devices) are thick client EGMs (or personal gaming devices). In other embodiments in which the gaming system includes one or more EGMs (or personal gaming devices), certain functions of one or more of the EGMs (or personal gaming devices) are implemented in a thin client environment, and certain other functions of one or more of the EGMs (or personal gaming devices) are implemented in a thick client environment. In one such embodiment in which the gaming system includes an EGM (or personal gaming device) and a server, computerized instructions for controlling any primary or base games displayed by the EGM (or personal gaming device) are communicated from the server to the EGM (or personal gaming device) in a thick client configuration, and computerized instructions for controlling any secondary or bonus games or other functions displayed by the EGM (or personal gaming device) are executed by the server in a thin client configuration.

In certain embodiments in which the gaming system includes: (a) an EGM (or personal gaming device) configured to communicate with a server through a data network; and/or (b) a plurality of EGMs (or personal gaming devices) configured to communicate with one another through a data network, the data network is a local area network (LAN) in which the EGMs (or personal gaming devices) are located substantially proximate to one another and/or the server. In one example, the EGMs (or personal gaming devices) and the server are located in a gaming establishment or a portion of a gaming establishment.

In other embodiments in which the gaming system includes: (a) an EGM (or personal gaming device) configured to communicate with a server through a data network; and/or (b) a plurality of EGMs (or personal gaming devices) configured to communicate with one another through a data network, the data network is a wide area network (WAN) in which one or more of the EGMs (or personal gaming devices) are not necessarily located substantially proximate to another one of the EGMs (or personal gaming devices) and/or the server. For example, one or more of the EGMs (or personal gaming devices) are located: (a) in an area of a gaming establishment different from an area of the gaming establishment in which the server is located; or (b) in a gaming establishment different from the gaming establishment in which the server is located. In another example, the server is not located within a gaming establishment in which the EGMs (or personal gaming devices) are located. In certain embodiments in which the data network is a WAN, the gaming system includes a server and an EGM (or personal gaming device) each located in a different gaming establishment in a same geographic area, such as a same city or a same state. Gaming systems in which the data network is a WAN are substantially identical to gaming systems in which the data network is a LAN, though the quantity of EGMs (or personal gaming devices) in such gaming systems may vary relative to one another.

In further embodiments in which the gaming system includes: (a) an EGM (or personal gaming device) configured to communicate with a server through a data network; and/or (b) a plurality of EGMs (or personal gaming devices) configured to communicate with one another through a data network, the data network is an internet (such as the Internet) or an intranet. In certain such embodiments, an Internet browser of the EGM (or personal gaming device) is usable to access an Internet game page from any location where an Internet connection is available. In one such embodiment, after the EGM (or personal gaming device) accesses the Internet game page, the server identifies a player before enabling that player to place any wagers on any plays of any wagering games. In one example, the server identifies the player by requiring a player account of the player to be logged into via an input of a unique username and password combination assigned to the player. The server may, however, identify the player in any other suitable manner, such as by validating a player tracking identification number associated with the player; by reading a player tracking card or other smart card inserted into a card reader (as described below); by validating a unique player identification number associated with the player by the server; or by identifying the EGM (or personal gaming device), such as by identifying the MAC address or the IP address of the Internet facilitator. In various embodiments, once the server identifies the player, the server enables placement of one or more wagers on one or more plays of one or more primary or base games and/or one or more secondary or bonus games, and displays those plays via the Internet browser of the EGM (or personal gaming device).

The server and the EGM (or personal gaming device) are configured to connect to the data network or remote communications link in any suitable manner. In various embodiments, such a connection is accomplished via: a conventional phone line or other data transmission line, a digital subscriber line (DSL), a T-1 line, a coaxial cable, a fiber optic cable, a wireless or wired routing device, a mobile communications network connection (such as a cellular network or mobile Internet network), or any other suitable medium. The expansion in the quantity of computing devices and the quantity and speed of Internet connections in recent years increases opportunities for players to use a variety of EGMs (or personal gaming devices) to play games from an ever-increasing quantity of remote sites. Additionally, the enhanced bandwidth of digital wireless communications may render such technology suitable for some or all communications, particularly if such communications are encrypted. Higher data transmission speeds may be useful for enhancing the sophistication and response of the display and interaction with players.

FIG. **3** is a block diagram of an example EGM **1000** and FIGS. **4**A and **4**B include two different example EGMs **2000***a* and **2000***b*. The EGMs **1000**, **2000***a*, and **2000***b* are merely example EGMs, and different EGMs may be implemented using different combinations of the components shown in the EGMs **1000**, **2000***a*, and **2000***b*. Although the below refers to EGMs, in various embodiments personal

gaming devices (such as personal gaming device **2000***c* of FIG. **4**C) may include some or all of the below components.

In these embodiments, the EGM **1000** includes a master gaming controller **1012** configured to communicate with and to operate with a plurality of peripheral devices **1022**.

The master gaming controller **1012** includes at least one processor **1010**. The at least one processor **1010** is any suitable processing device or set of processing devices, such as a microprocessor, a microcontroller-based platform, a suitable integrated circuit, or one or more application-specific integrated circuits (ASICs), configured to execute software enabling various configuration and reconfiguration tasks, such as: (1) communicating with a remote source (such as a server that stores authentication information or game information) via a communication interface **1006** of the master gaming controller **1012**; (2) converting signals read by an interface to a format corresponding to that used by software or memory of the EGM; (3) accessing memory to configure or reconfigure game parameters in the memory according to indicia read from the EGM; (4) communicating with interfaces and the peripheral devices **1022** (such as input/output devices); and/or (5) controlling the peripheral devices **1022**. In certain embodiments, one or more components of the master gaming controller **1012** (such as the at least one processor **1010**) reside within a housing of the EGM (described below), while in other embodiments at least one component of the master gaming controller **1012** resides outside of the housing of the EGM.

The master gaming controller **1012** also includes at least one memory device **1016**, which includes: (1) volatile memory (e.g., RAM **1009**, which can include non-volatile RAM, magnetic RAM, ferroelectric RAM, and any other suitable forms); (2) non-volatile memory **1019** (e.g., disk memory, FLASH memory, EPROMs, EEPROMs, memristor-based non-volatile solid-state memory, etc.); (3) unalterable memory (e.g., EPROMs **1008**); (4) read-only memory; and/or (5) a secondary memory storage device **1015**, such as a non-volatile memory device, configured to store gaming software related information (the gaming software related information and the memory may be used to store various audio files and games not currently being used and invoked in a configuration or reconfiguration). Any other suitable magnetic, optical, and/or semiconductor memory may operate in conjunction with the EGM of the present disclosure. In certain embodiments, the at least one memory device **1016** resides within the housing of the EGM (described below), while in other embodiments at least one component of the at least one memory device **1016** resides outside of the housing of the EGM. In these embodiments, any combination of one or more computer readable media may be utilized. The computer readable media may be a computer readable signal medium or a computer readable storage medium. A computer readable storage medium may be, for example, but not limited to, an electronic, magnetic, optical, electromagnetic, or semiconductor system, apparatus, or device, or any suitable combination of the foregoing. More specific examples (a non-exhaustive list) of the computer readable storage medium would include the following: a portable computer diskette, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), an appropriate optical fiber with a repeater, a portable compact disc read-only memory (CD-ROM), an optical storage device, a magnetic storage device, or any suitable combination of the foregoing. In the context of this document, a computer readable storage medium may be any tangible medium that can contain, or store a program for use by or in connection with an instruction execution system, apparatus, or device.

A computer readable signal medium may include a propagated data signal with computer readable program code embodied therein, for example, in baseband or as part of a carrier wave. Such a propagated signal may take any of a variety of forms, including, but not limited to, electromagnetic, optical, or any suitable combination thereof. A computer readable signal medium may be any computer readable medium that is not a computer readable storage medium and that can communicate, propagate, or transport a program for use by or in connection with an instruction execution system, apparatus, or device. Program code embodied on a computer readable signal medium may be transmitted using any appropriate medium, including but not limited to wireless, wireline, optical fiber cable, RF, etc., or any suitable combination of the foregoing.

The at least one memory device **1016** is configured to store, for example: (1) configuration software **1014**, such as all the parameters and settings for a game playable on the EGM; (2) associations **1018** between configuration indicia read from an EGM with one or more parameters and settings; (3) communication protocols configured to enable the at least one processor **1010** to communicate with the peripheral devices **1022**; and/or (4) communication transport protocols (such as TCP/IP, USB, Firewire, IEEE1394, Bluetooth, IEEE 802.11x (IEEE 802.11 standards), hiperlan/2, HomeRF, etc.) configured to enable the EGM to communicate with local and non-local devices using such protocols. In one implementation, the master gaming controller **1012** communicates with other devices using a serial communication protocol. A few non-limiting examples of serial communication protocols that other devices, such as peripherals (e.g., a bill validator or a ticket printer), may use to communicate with the master game controller **1012** include USB, RS-232, and Netplex (a proprietary protocol developed by IGT).

As will be appreciated by one skilled in the art, aspects of the present disclosure may be illustrated and described herein in any of a number of patentable classes or context including any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof. Accordingly, aspects of the present disclosure may be implemented entirely hardware, entirely software (including firmware, resident software, micro-code, etc.) or combining software and hardware implementation that may all generally be referred to herein as a "circuit," "module," "component," or "system." Furthermore, aspects of the present disclosure may take the form of a computer program product embodied in one or more computer readable media having computer readable program code embodied thereon.

Computer program code for carrying out operations for aspects of the present disclosure may be written in any combination of one or more programming languages, including an object oriented programming language such as Java, Scala, Smalltalk, Eiffel, JADE, Emerald, C++, C#, VB.NET, Python or the like, conventional procedural programming languages, such as the "C" programming language, Visual Basic, Fortran 2003, Perl, COBOL 2002, PHP, ABAP, dynamic programming languages such as Python, Ruby and Groovy, or other programming languages. The program code may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer or

server. In the latter scenario, the remote computer may be connected to the user's computer through any type of network, including a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider) or in a cloud computing environment or offered as a service such as a Software as a Service (SaaS).

Aspects of the present disclosure are described herein with reference to flowchart illustrations and/or block diagrams of methods, apparatuses (systems) and computer program products according to embodiments of the disclosure. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable instruction execution apparatus, create a mechanism for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

These computer program instructions may also be stored in a computer readable medium that when executed can direct a computer, other programmable data processing apparatus, or other devices to function in a particular manner, such that the instructions when stored in the computer readable medium produce an article of manufacture including instructions which when executed, cause a computer to implement the function/act specified in the flowchart and/or block diagram block or blocks. The computer program instructions may also be loaded onto a computer, other programmable instruction execution apparatus, or other devices to cause a series of operational steps to be performed on the computer, other programmable apparatuses or other devices to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide processes for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

In certain embodiments, the at least one memory device **1016** is configured to store program code and instructions executable by the at least one processor of the EGM to control the EGM. The at least one memory device **1016** of the EGM also stores other operating data, such as image data, event data, input data, random number generators (RNGs) or pseudo-RNGs, paytable data or information, and/or applicable game rules that relate to the play of one or more games on the EGM. In various embodiments, part or all of the program code and/or the operating data described above is stored in at least one detachable or removable memory device including, but not limited to, a cartridge, a disk, a CD ROM, a DVD, a USB memory device, or any other suitable non-transitory computer readable medium. In certain such embodiments, an operator (such as a gaming establishment operator) and/or a player uses such a removable memory device in an EGM to implement at least part of the present disclosure. In other embodiments, part or all of the program code and/or the operating data is downloaded to the at least one memory device of the EGM through any suitable data network described above (such as an Internet or intranet).

The at least one memory device **1016** also stores a plurality of device drivers **1042**. Examples of different types of device drivers include device drivers for EGM components and device drivers for the peripheral components **1022**. Typically, the device drivers **1042** utilize various communication protocols that enable communication with a particular physical device. The device driver abstracts the hardware implementation of that device. For example, a device driver may be written for each type of card reader that could potentially be connected to the EGM. Non-limiting examples of communication protocols used to implement the device drivers include Netplex, USB, Serial, Ethernet **175**, Firewire, I/O debouncer, direct memory map, serial, PCI, parallel, RF, Bluetooth™, near-field communications (e.g., using near-field magnetics), 802.11 (WiFi), etc. In one embodiment, when one type of a particular device is exchanged for another type of the particular device, the at least one processor of the EGM loads the new device driver from the at least one memory device to enable communication with the new device. For instance, one type of card reader in the EGM can be replaced with a second different type of card reader when device drivers for both card readers are stored in the at least one memory device.

In certain embodiments, the software units stored in the at least one memory device **1016** can be upgraded as needed. For instance, when the at least one memory device **1016** is a hard drive, new games, new game options, new parameters, new settings for existing parameters, new settings for new parameters, new device drivers, and new communication protocols can be uploaded to the at least one memory device **1016** from the master game controller **1012** or from some other external device. As another example, when the at least one memory device **1016** includes a CD/DVD drive including a CD/DVD configured to store game options, parameters, and settings, the software stored in the at least one memory device **1016** can be upgraded by replacing a first CD/DVD with a second CD/DVD. In yet another example, when the at least one memory device **1016** uses flash memory **1019** or EPROM **1008** units configured to store games, game options, parameters, and settings, the software stored in the flash and/or EPROM memory units can be upgraded by replacing one or more memory units with new memory units that include the upgraded software. In another embodiment, one or more of the memory devices, such as the hard drive, may be employed in a game software download process from a remote software server.

In some embodiments, the at least one memory device **1016** also stores authentication and/or validation components **1044** configured to authenticate/validate specified EGM components and/or information, such as hardware components, software components, firmware components, peripheral device components, user input device components, information received from one or more user input devices, information stored in the at least one memory device **1016**, etc.

In certain embodiments, the peripheral devices **1022** include several device interfaces, such as: (1) at least one output device **1020** including at least one display device **1035**; (2) at least one input device **1030** (which may include contact and/or non-contact interfaces); (3) at least one transponder **1054**; (4) at least one wireless communication component **1056**; (5) at least one wired/wireless power distribution component **1058**; (6) at least one sensor **1060**; (7) at least one data preservation component **1062**; (8) at least one motion/gesture analysis and interpretation component **1064**; (9) at least one motion detection component **1066**; (10) at least one portable power source **1068**; (11) at least one geolocation module **1076**; (12) at least one user

identification module **1077**; (13) at least one player/device tracking module **1078**; and (14) at least one information filtering module **1079**.

The at least one output device **1020** includes at least one display device **1035** configured to display any game(s) displayed by the EGM and any suitable information associated with such game(s). In certain embodiments, the display devices are connected to or mounted on a housing of the EGM (described below). In various embodiments, the display devices serve as digital glass configured to advertise certain games or other aspects of the gaming establishment in which the EGM is located. In various embodiments, the EGM includes one or more of the following display devices: (a) a central display device; (b) a player tracking display configured to display various information regarding a player's player tracking status (as described below); (c) a secondary or upper display device in addition to the central display device and the player tracking display; (d) a credit display configured to display a current quantity of credits, amount of cash, account balance, or the equivalent; and (e) a bet display configured to display an amount wagered for one or more plays of one or more games. The example EGM **2000***a* illustrated in FIG. **4**A includes a central display device **2116**, a player tracking display **2140**, a credit display **2120**, and a bet display **2122**. The example EGM **2000***b* illustrated in FIG. **4**B includes a central display device **2116**, an upper display device **2118**, a player tracking display **2140**, a credit display **2120**, and a bet display **2122**.

In various embodiments, the display devices include, without limitation: a monitor, a television display, a plasma display, a liquid crystal display (LCD), a display based on light emitting diodes (LEDs), a display based on a plurality of organic light-emitting diodes (OLEDs), a display based on polymer light-emitting diodes (PLEDs), a display based on a plurality of surface-conduction electron-emitters (SEDs), a display including a projected and/or reflected image, or any other suitable electronic device or display mechanism. In certain embodiments, as described above, the display device includes a touch-screen with an associated touch-screen controller. The display devices may be of any suitable sizes, shapes, and configurations.

The display devices of the EGM are configured to display one or more game and/or non-game images, symbols, and indicia. In certain embodiments, the display devices of the EGM are configured to display any suitable visual representation or exhibition of the movement of objects; dynamic lighting; video images; images of people, characters, places, things, and faces of cards; and the like. In certain embodiments, the display devices of the EGM are configured to display one or more video reels, one or more video wheels, and/or one or more video dice. In other embodiments, certain of the displayed images, symbols, and indicia are in mechanical form. That is, in these embodiments, the display device includes any electromechanical device, such as one or more rotatable wheels, one or more reels, and/or one or more dice, configured to display at least one or a plurality of game or other suitable images, symbols, or indicia.

In various embodiments, the at least one output device **1020** includes a payout device. In these embodiments, after the EGM receives an actuation of a cashout device (described below), the EGM causes the payout device to provide a payment to the player. In one embodiment, the payout device is one or more of: (a) a ticket printer and dispenser configured to print and dispense a ticket or credit slip associated with a monetary value, wherein the ticket or credit slip may be redeemed for its monetary value via a cashier, a kiosk, or other suitable redemption system; (b) a bill dispenser configured to dispense paper currency; (c) a coin dispenser configured to dispense coins or tokens (such as into a coin payout tray); and (d) any suitable combination thereof. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a ticket printer and dispenser **2136**.

In certain embodiments, rather than dispensing bills, coins, or a physical ticket having a monetary value to the player following receipt of an actuation of the cashout device, the payout device is configured to cause a payment to be provided to the player in the form of an electronic funds transfer, such as via a direct deposit into a bank account, a casino account, or a prepaid account of the player; via a transfer of funds onto an electronically recordable identification card or smart card of the player; or via sending a virtual ticket having a monetary value to an electronic device of the player.

While any credit balances, any wagers, any values, and any awards are described herein as amounts of monetary credits or currency, one or more of such credit balances, such wagers, such values, and such awards may be for non-monetary credits, promotional credits, of player tracking points or credits.

In certain embodiments, the at least one output device **1020** is a sound generating device controlled by one or more sound cards. In one such embodiment, the sound generating device includes one or more speakers or other sound generating hardware and/or software configured to generate sounds, such as by playing music for any games or by playing music for other modes of the EGM, such as an attract mode. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a plurality of speakers **2150**. In another such embodiment, the EGM provides dynamic sounds coupled with attractive multimedia images displayed on one or more of the display devices to provide an audio-visual representation or to otherwise display full-motion video with sound to attract players to the EGM. In certain embodiments, the EGM displays a sequence of audio and/or visual attraction messages during idle periods to attract potential players to the EGM. The videos may be customized to provide any appropriate information.

The at least one input device **1030** may include any suitable device that enables an input signal to be produced and received by the at least one processor **1010** of the EGM.

In one embodiment, the at least one input device **1030** includes a payment device configured to communicate with the at least one processor of the EGM to fund the EGM. In certain embodiments, the payment device includes one or more of: (a) a bill acceptor into which paper money is inserted to fund the EGM; (b) a ticket acceptor into which a ticket or a voucher is inserted to fund the EGM; (c) a coin slot into which coins or tokens are inserted to fund the EGM; (d) a reader or a validator for credit cards, debit cards, or credit slips into which a credit card, debit card, or credit slip is inserted to fund the EGM; (e) a player identification card reader into which a player identification card is inserted to fund the EGM; or (f) any suitable combination thereof. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a combined bill and ticket acceptor **2128** and a coin slot **2126**.

In one embodiment, the at least one input device **1030** includes a payment device configured to enable the EGM to be funded via an electronic funds transfer, such as a transfer of funds from a bank account. In another embodiment, the EGM includes a payment device configured to communicate with a mobile device of a player, such as a mobile phone, a

radio frequency identification tag, or any other suitable wired or wireless device, to retrieve relevant information associated with that player to fund the EGM. When the EGM is funded, the at least one processor determines the amount of funds entered and displays the corresponding amount on a credit display or any other suitable display as described below.

In certain embodiments, the at least one input device **1030** includes at least one wagering or betting device. In various embodiments, the one or more wagering or betting devices are each: (1) a mechanical button supported by the housing of the EGM (such as a hard key or a programmable soft key), or (2) an icon displayed on a display device of the EGM (described below) that is actuatable via a touch screen of the EGM (described below) or via use of a suitable input device of the EGM (such as a mouse or a joystick). One such wagering or betting device is as a maximum wager or bet device that, when actuated, causes the EGM to place a maximum wager on a play of a game. Another such wagering or betting device is a repeat bet device that, when actuated, causes the EGM to place a wager that is equal to the previously-placed wager on a play of a game. A further such wagering or betting device is a bet one device that, when actuated, causes the EGM to increase the wager by one credit. Generally, upon actuation of one of the wagering or betting devices, the quantity of credits displayed in a credit meter (described below) decreases by the amount of credits wagered, while the quantity of credits displayed in a bet display (described below) increases by the amount of credits wagered.

In various embodiments, the at least one input device **1030** includes at least one game play activation device. In various embodiments, the one or more game play initiation devices are each: (1) a mechanical button supported by the housing of the EGM (such as a hard key or a programmable soft key), or (2) an icon displayed on a display device of the EGM (described below) that is actuatable via a touch screen of the EGM (described below) or via use of a suitable input device of the EGM (such as a mouse or a joystick). After a player appropriately funds the EGM and places a wager, the EGM activates the game play activation device to enable the player to actuate the game play activation device to initiate a play of a game on the EGM (or another suitable sequence of events associated with the EGM). After the EGM receives an actuation of the game play activation device, the EGM initiates the play of the game. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a game play activation device in the form of a game play initiation button **2132**. In other embodiments, the EGM begins game play automatically upon appropriate funding rather than upon utilization of the game play activation device.

In other embodiments, the at least one input device **1030** includes a cashout device. In various embodiments, the cashout device is: (1) a mechanical button supported by the housing of the EGM (such as a hard key or a programmable soft key), or (2) an icon displayed on a display device of the EGM (described below) that is actuatable via a touch screen of the EGM (described below) or via use of a suitable input device of the EGM (such as a mouse or a joystick). When the EGM receives an actuation of the cashout device from a player and the player has a positive (i.e., greater-than-zero) credit balance, the EGM initiates a payout associated with the player's credit balance. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a cashout device in the form of a cashout button **2134**.

In various embodiments, the at least one input device **1030** includes a plurality of buttons that are programmable by the EGM operator to, when actuated, cause the EGM to perform particular functions. For instance, such buttons may be hard keys, programmable soft keys, or icons icon displayed on a display device of the EGM (described below) that are actuatable via a touch screen of the EGM (described below) or via use of a suitable input device of the EGM (such as a mouse or a joystick). The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a plurality of such buttons **2130**.

In certain embodiments, the at least one input device **1030** includes a touch-screen coupled to a touch-screen controller or other touch-sensitive display overlay to enable interaction with any images displayed on a display device (as described below). One such input device is a conventional touch-screen button panel. The touch-screen and the touch-screen controller are connected to a video controller. In these embodiments, signals are input to the EGM by touching the touch screen at the appropriate locations.

In embodiments including a player tracking system, as further described below, the at least one input device **1030** includes a card reader in communication with the at least one processor of the EGM. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a card reader **2138**. The card reader is configured to read a player identification card inserted into the card reader.

The at least one wireless communication component **1056** includes one or more communication interfaces having different architectures and utilizing a variety of protocols, such as (but not limited to) 802.11 (WiFi); 802.15 (including Bluetooth™); 802.16 (WiMax); 802.22; cellular standards such as CDMA, CDMA2000, and WCDMA; Radio Frequency (e.g., RFID); infrared; and Near Field Magnetic communication protocols. The at least one wireless communication component **1056** transmits electrical, electromagnetic, or optical signals that carry digital data streams or analog signals representing various types of information.

The at least one wired/wireless power distribution component **1058** includes components or devices that are configured to provide power to other devices. For example, in one embodiment, the at least one power distribution component **1058** includes a magnetic induction system that is configured to provide wireless power to one or more user input devices near the EGM. In one embodiment, a user input device docking region is provided, and includes a power distribution component that is configured to recharge a user input device without requiring metal-to-metal contact. In one embodiment, the at least one power distribution component **1058** is configured to distribute power to one or more internal components of the EGM, such as one or more rechargeable power sources (e.g., rechargeable batteries) located at the EGM.

In certain embodiments, the at least one sensor **1060** includes at least one of: optical sensors, pressure sensors, RF sensors, infrared sensors, image sensors, thermal sensors, and biometric sensors. The at least one sensor **1060** may be used for a variety of functions, such as: detecting movements and/or gestures of various objects within a predetermined proximity to the EGM; detecting the presence and/or identity of various persons (e.g., players, casino employees, etc.), devices (e.g., user input devices), and/or systems within a predetermined proximity to the EGM.

The at least one data preservation component **1062** is configured to detect or sense one or more events and/or conditions that, for example, may result in damage to the EGM and/or that may result in loss of information associ-

ated with the EGM. Additionally, the data preservation system **1062** may be operable to initiate one or more appropriate action(s) in response to the detection of such events/conditions.

The at least one motion/gesture analysis and interpretation component **1064** is configured to analyze and/or interpret information relating to detected player movements and/or gestures to determine appropriate player input information relating to the detected player movements and/or gestures. For example, in one embodiment, the at least one motion/gesture analysis and interpretation component **1064** is configured to perform one or more of the following functions: analyze the detected gross motion or gestures of a player; interpret the player's motion or gestures (e.g., in the context of a casino game being played) to identify instructions or input from the player; utilize the interpreted instructions/input to advance the game state; etc. In other embodiments, at least a portion of these additional functions may be implemented at a remote system or device.

The at least one portable power source **1068** enables the EGM to operate in a mobile environment. For example, in one embodiment, the EGM **300** includes one or more rechargeable batteries.

The at least one geolocation module **1076** is configured to acquire geolocation information from one or more remote sources and use the acquired geolocation information to determine information relating to a relative and/or absolute position of the EGM. For example, in one implementation, the at least one geolocation module **1076** is configured to receive GPS signal information for use in determining the position or location of the EGM. In another implementation, the at least one geolocation module **1076** is configured to receive multiple wireless signals from multiple remote devices (e.g., EGMs, servers, wireless access points, etc.) and use the signal information to compute position/location information relating to the position or location of the EGM.

The at least one user identification module **1077** is configured to determine the identity of the current user or current owner of the EGM. For example, in one embodiment, the current user is required to perform a login process at the EGM in order to access one or more features. Alternatively, the EGM is configured to automatically determine the identity of the current user based on one or more external signals, such as an RFID tag or badge worn by the current user and that provides a wireless signal to the EGM that is used to determine the identity of the current user. In at least one embodiment, various security features are incorporated into the EGM to prevent unauthorized users from accessing confidential or sensitive information.

The at least one information filtering module **1079** is configured to perform filtering (e.g., based on specified criteria) of selected information to be displayed at one or more displays **1035** of the EGM.

In various embodiments, the EGM includes a plurality of communication ports configured to enable the at least one processor of the EGM to communicate with and to operate with external peripherals, such as: accelerometers, arcade sticks, bar code readers, bill validators, biometric input devices, bonus devices, button panels, card readers, coin dispensers, coin hoppers, display screens or other displays or video sources, expansion buses, information panels, keypads, lights, mass storage devices, microphones, motion sensors, motors, printers, reels, SCSI ports, solenoids, speakers, thumbsticks, ticket readers, touch screens, trackballs, touchpads, wheels, and wireless communication devices.

As generally described above, in certain embodiments, such as the example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B, the EGM has a support structure, housing, or cabinet that provides support for a plurality of the input devices and the output devices of the EGM. Further, the EGM is configured such that a player may operate it while standing or sitting. In various embodiments, the EGM is positioned on a base or stand, or is configured as a pub-style tabletop game (not shown) that a player may operate typically while sitting. As illustrated by the different example EGMs **2000***a* and **2000***b* shown in FIGS. **4**A and **4**B, EGMs may have varying housing and display configurations.

In certain embodiments, the EGM is a device that has obtained approval from a regulatory gaming commission, and in other embodiments, the EGM is a device that has not obtained approval from a regulatory gaming commission.

The EGMs described above are merely three examples of different types of EGMs. Certain of these example EGMs may include one or more elements that may not be included in all gaming systems, and these example EGMs may not include one or more elements that are included in other gaming systems. For example, certain EGMs include a coin acceptor while others do not.

In various embodiments, an EGM may be implemented in one of a variety of different configurations. In various embodiments, the EGM may be implemented as one of: (a) a dedicated EGM in which computerized game programs executable by the EGM for controlling any primary or base games (referred to herein as "primary games") and/or any secondary or bonus games or other functions (referred to herein as "secondary games") displayed by the EGM are provided with the EGM before delivery to a gaming establishment or before being provided to a player; and (b) a changeable EGM in which computerized game programs executable by the EGM for controlling any primary games and/or secondary games displayed by the EGM are downloadable or otherwise transferred to the EGM through a data network or remote communication link; from a USB drive, flash memory card, or other suitable memory device; or in any other suitable manner after the EGM is physically located in a gaming establishment or after the EGM is provided to a player.

As generally explained above, in various embodiments in which the gaming system includes a server and a changeable EGM, the at least one memory device of the server stores different game programs and instructions executable by the at least one processor of the changeable EGM to control one or more primary games and/or secondary games displayed by the changeable EGM. More specifically, each such executable game program represents a different game or a different type of game that the at least one changeable EGM is configured to operate. In one example, certain of the game programs are executable by the changeable EGM to operate games having the same or substantially the same game play but different paytables. In different embodiments, each executable game program is associated with a primary game, a secondary game, or both. In certain embodiments, an executable game program is executable by the at least one processor of the at least one changeable EGM as a secondary game to be played simultaneously with a play of a primary game (which may be downloaded to or otherwise stored on the at least one changeable EGM), or vice versa.

In operation of such embodiments, the server is configured to communicate one or more of the stored executable game programs to the at least one processor of the changeable EGM. In different embodiments, a stored executable game program is communicated or delivered to the at least

one processor of the changeable EGM by: (a) embedding the executable game program in a device or a component (such as a microchip to be inserted into the changeable EGM); (b) writing the executable game program onto a disc or other media; or (c) uploading or streaming the executable game program over a data network (such as a dedicated data network). After the executable game program is communicated from the server to the changeable EGM, the at least one processor of the changeable EGM executes the executable game program to enable the primary game and/or the secondary game associated with that executable game program to be played using the display device(s) and/or the input device(s) of the changeable EGM. That is, when an executable game program is communicated to the at least one processor of the changeable EGM, the at least one processor of the changeable EGM changes the game or the type of game that may be played using the changeable EGM.

In certain embodiments, the gaming system randomly determines any game outcome(s) (such as a win outcome) and/or award(s) (such as a quantity of credits to award for the win outcome) for a play of a primary game and/or a play of a secondary game based on probability data. In certain such embodiments, this random determination is provided through utilization of an RNG, such as a true RNG or a pseudo RNG, or any other suitable randomization process. In one such embodiment, each game outcome or award is associated with a probability, and the gaming system generates the game outcome(s) and/or the award(s) to be provided based on the associated probabilities. In these embodiments, since the gaming system generates game outcomes and/or awards randomly or based on one or more probability calculations, there is no certainty that the gaming system will ever provide any specific game outcome and/or award.

In certain embodiments, the gaming system maintains one or more predetermined pools or sets of predetermined game outcomes and/or awards. In certain such embodiments, upon generation or receipt of a game outcome and/or award request, the gaming system independently selects one of the predetermined game outcomes and/or awards from the one or more pools or sets. The gaming system flags or marks the selected game outcome and/or award as used. Once a game outcome or an award is flagged as used, it is prevented from further selection from its respective pool or set; that is, the gaming system does not select that game outcome or award upon another game outcome and/or award request. The gaming system provides the selected game outcome and/or award.

In certain embodiments, the gaming system determines a predetermined game outcome and/or award based on the results of a bingo, keno, or lottery game. In certain such embodiments, the gaming system utilizes one or more bingo, keno, or lottery games to determine the predetermined game outcome and/or award provided for a primary game and/or a secondary game. The gaming system is provided or associated with a bingo card. Each bingo card consists of a matrix or array of elements, wherein each element is designated with separate indicia. After a bingo card is provided, the gaming system randomly selects or draws a plurality of the elements. As each element is selected, a determination is made as to whether the selected element is present on the bingo card. If the selected element is present on the bingo card, that selected element on the provided bingo card is marked or flagged. This process of selecting elements and marking any selected elements on the provided bingo cards continues until one or more predetermined patterns are marked on one or more of the provided bingo cards. After one or more predetermined patterns are marked on one or more of the provided bingo cards, game outcome and/or award is determined based, at least in part, on the selected elements on the provided bingo cards.

In certain embodiments in which the gaming system includes a server and an EGM, the EGM is configured to communicate with the server for monitoring purposes only. In such embodiments, the EGM determines the game outcome(s) and/or award(s) to be provided in any of the manners described above, and the server monitors the activities and events occurring on the EGM. In one such embodiment, the gaming system includes a real-time or online accounting and gaming information system configured to communicate with the server. In this embodiment, the accounting and gaming information system includes: (a) a player database configured to store player profiles, (b) a player tracking module configured to track players (as described below), and (c) a credit system configured to provide automated transactions.

As noted above, in various embodiments, the gaming system includes one or more executable game programs executable by at least one processor of the gaming system to provide one or more primary games and one or more secondary games. The primary game(s) and the secondary game(s) may comprise any suitable games and/or wagering games, such as, but not limited to: electro-mechanical or video slot or spinning reel type games; video card games such as video draw poker, multi-hand video draw poker, other video poker games, video blackjack games, and video baccarat games; video keno games; video bingo games; and video selection games.

In certain embodiments in which the primary game is a slot or spinning reel type game, the gaming system includes one or more reels in either an electromechanical form with mechanical rotating reels or in a video form with simulated reels and movement thereof. Each reel displays a plurality of indicia or symbols, such as bells, hearts, fruits, numbers, letters, bars, or other images that typically correspond to a theme associated with the gaming system. In certain such embodiments, the gaming system includes one or more paylines associated with the reels. The example EGM **2000***b* shown in FIG. **4**B includes a payline **1152** and a plurality of reels **1154**. In certain embodiments, one or more of the reels are independent reels or unisymbol reels. In such embodiments, each independent reel generates and displays one symbol.

In various embodiments, one or more of the paylines is horizontal, vertical, circular, diagonal, angled, or any suitable combination thereof. In other embodiments, each of one or more of the paylines is associated with a plurality of adjacent symbol display areas on a requisite number of adjacent reels. In one such embodiment, one or more paylines are formed between at least two symbol display areas that are adjacent to each other by either sharing a common side or sharing a common corner (i.e., such paylines are connected paylines). The gaming system enables a wager to be placed on one or more of such paylines to activate such paylines. In other embodiments in which one or more paylines are formed between at least two adjacent symbol display areas, the gaming system enables a wager to be placed on a plurality of symbol display areas, which activates those symbol display areas.

In various embodiments, the gaming system provides one or more awards after a spin of the reels when specified types and/or configurations of the indicia or symbols on the reels occur on an active payline or otherwise occur in a winning pattern, occur on the requisite number of adjacent reels, and/or occur in a scatter pay arrangement.

In certain embodiments, the gaming system employs a ways to win award determination. In these embodiments, any outcome to be provided is determined based on a number of associated symbols that are generated in active symbol display areas on the requisite number of adjacent reels (i.e., not on paylines passing through any displayed winning symbol combinations). If a winning symbol combination is generated on the reels, one award for that occurrence of the generated winning symbol combination is provided.

In various embodiments, the gaming system includes a progressive award. Typically, a progressive award includes an initial amount and an additional amount funded through a portion of each wager placed to initiate a play of a primary game. When one or more triggering events occurs, the gaming system provides at least a portion of the progressive award. After the gaming system provides the progressive award, an amount of the progressive award is reset to the initial amount and a portion of each subsequent wager is allocated to the next progressive award.

As generally noted above, in addition to providing winning credits or other awards for one or more plays of the primary game(s), in various embodiments the gaming system provides credits or other awards for one or more plays of one or more secondary games. The secondary game typically enables an award to be obtained addition to any award obtained through play of the primary game(s). The secondary game(s) typically produces a higher level of player excitement than the primary game(s) because the secondary game(s) provides a greater expectation of winning than the primary game(s) and is accompanied with more attractive or unusual features than the primary game (s). The secondary game(s) may be any type of suitable game, either similar to or completely different from the primary game.

In various embodiments, the gaming system automatically provides or initiates the secondary game upon the occurrence of a triggering event or the satisfaction of a qualifying condition. In other embodiments, the gaming system initiates the secondary game upon the occurrence of the triggering event or the satisfaction of the qualifying condition and upon receipt of an initiation input. In certain embodiments, the triggering event or qualifying condition is a selected outcome in the primary game(s) or a particular arrangement of one or more indicia on a display device for a play of the primary game(s), such as a "BONUS" symbol appearing on three adjacent reels along a payline following a spin of the reels for a play of the primary game. In other embodiments, the triggering event or qualifying condition occurs based on a certain amount of game play (such as number of games, number of credits, amount of time) being exceeded, or based on a specified number of points being earned during game play. Any suitable triggering event or qualifying condition or any suitable combination of a plurality of different triggering events or qualifying conditions may be employed.

In other embodiments, at least one processor of the gaming system randomly determines when to provide one or more plays of one or more secondary games. In one such embodiment, no apparent reason is provided for providing the secondary game. In this embodiment, qualifying for a secondary game is not triggered by the occurrence of an event in any primary game or based specifically on any of the plays of any primary game. That is, qualification is provided without any explanation or, alternatively, with a simple explanation. In another such embodiment, the gaming system determines qualification for a secondary game at least partially based on a game triggered or symbol triggered event, such as at least partially based on play of a primary game.

In various embodiments, after qualification for a secondary game has been determined, the secondary game participation may be enhanced through continued play on the primary game. Thus, in certain embodiments, for each secondary game qualifying event, such as a secondary game symbol, that is obtained, a given number of secondary game wagering points or credits is accumulated in a "secondary game meter" configured to accrue the secondary game wagering credits or entries toward eventual participation in the secondary game. In one such embodiment, the occurrence of multiple such secondary game qualifying events in the primary game results in an arithmetic or exponential increase in the number of secondary game wagering credits awarded. In another such embodiment, any extra secondary game wagering credits may be redeemed during the secondary game to extend play of the secondary game.

In certain embodiments, no separate entry fee or buy-in for the secondary game is required. That is, entry into the secondary game cannot be purchased; rather, in these embodiments entry must be won or earned through play of the primary game, thereby encouraging play of the primary game. In other embodiments, qualification for the secondary game is accomplished through a simple "buy-in." For example, qualification through other specified activities is unsuccessful, payment of a fee or placement of an additional wager "buys-in" to the secondary game. In certain embodiments, a separate side wager must be placed on the secondary game or a wager of a designated amount must be placed on the primary game to enable qualification for the secondary game. In these embodiments, the secondary game triggering event must occur and the side wager (or designated primary game wager amount) must have been placed for the secondary game to trigger.

In various embodiments in which the gaming system includes a plurality of EGMs, the EGMs are configured to communicate with one another to provide a group gaming environment. In certain such embodiments, the EGMs enable players of those EGMs to work in conjunction with one another, such as by enabling the players to play together as a team or group, to win one or more awards. In other such embodiments, the EGMs enable players of those EGMs to compete against one another for one or more awards. In one such embodiment, the EGMs enable the players of those EGMs to participate in one or more gaming tournaments for one or more awards.

In various embodiments, the gaming system includes one or more player tracking systems. Such player tracking systems enable operators of the gaming system (such as casinos or other gaming establishments) to recognize the value of customer loyalty by identifying frequent customers and rewarding them for their patronage. Such a player tracking system is configured to track a player's gaming activity. In one such embodiment, the player tracking system does so through the use of player tracking cards. In this embodiment, a player is issued a player identification card that has an encoded player identification number that uniquely identifies the player. When the player's playing tracking card is inserted into a card reader of the gaming system to begin a gaming session, the card reader reads the player identification number off the player tracking card to identify the player. The gaming system timely tracks any suitable information or data relating to the identified player's gaming session. The gaming system also timely tracks when the player tracking card is removed to conclude play for that

gaming session. In another embodiment, rather than requiring insertion of a player tracking card into the card reader, the gaming system utilizes one or more portable devices, such as a mobile phone, a radio frequency identification tag, or any other suitable wireless device, to track when a gaming session begins and ends. In another embodiment, the gaming system utilizes any suitable biometric technology or ticket technology to track when a gaming session begins and ends.

In such embodiments, during one or more gaming sessions, the gaming system tracks any suitable information or data, such as any amounts wagered, average wager amounts, and/or the time at which these wagers are placed. In different embodiments, for one or more players, the player tracking system includes the player's account number, the player's card number, the player's first name, the player's surname, the player's preferred name, the player's player tracking ranking, any promotion status associated with the player's player tracking card, the player's address, the player's birthday, the player's anniversary, the player's recent gaming sessions, or any other suitable data. In various embodiments, such tracked information and/or any suitable feature associated with the player tracking system is displayed on a player tracking display. In various embodiments, such tracked information and/or any suitable feature associated with the player tracking system is displayed via one or more service windows that are displayed on the central display device and/or the upper display device.

In various embodiments, the gaming system includes one or more servers configured to communicate with a personal gaming device—such as a smartphone, a tablet computer, a desktop computer, or a laptop computer—to enable web-based game play using the personal gaming device. In various embodiments, the player must first access a gaming website via an Internet browser of the personal gaming device or execute an application (commonly called an "app") installed on the personal gaming device before the player can use the personal gaming device to participate in web-based game play. In certain embodiments, the one or more servers and the personal gaming device operate in a thin-client environment. In these embodiments, the personal gaming device receives inputs via one or more input devices (such as a touch screen and/or physical buttons), the personal gaming device sends the received inputs to the one or more servers, the one or more servers make various determinations based on the inputs and determine content to be displayed (such as a randomly determined game outcome and corresponding award), the one or more servers send the content to the personal gaming device, and the personal gaming device displays the content.

In certain such embodiments, the one or more servers must identify the player before enabling game play on the personal gaming device (or, in some embodiments, before enabling monetary wager-based game play on the personal gaming device). In these embodiments, the player must identify herself to the one or more servers, such as by inputting the player's unique username and password combination, providing an input to a biometric sensor (e.g., a fingerprint sensor, a retinal sensor, a voice sensor, or a facial-recognition sensor), or providing any other suitable information.

Once identified, the one or more servers enable the player to establish an account balance from which the player can draw credits usable to wager on plays of a game. In certain embodiments, the one or more servers enable the player to initiate an electronic funds transfer to transfer funds from a bank account to the player's account balance. In other embodiments, the one or more servers enable the player to make a payment using the player's credit card, debit card, or other suitable device to add money to the player's account balance. In other embodiments, the one or more servers enable the player to add money to the player's account balance via a peer-to-peer type application, such as PayPal or Venmo. The one or more servers also enable the player to cash out the player's account balance (or part of it) in any suitable manner, such as via an electronic funds transfer, by initiating creation of a paper check that is mailed to the player, or by initiating printing of a voucher at a kiosk in a gaming establishment.

In certain embodiments, the one or more servers include a payment server that handles establishing and cashing out players' account balances and a separate game server configured to determine the outcome and any associated award for a play of a game. In these embodiments, the game server is configured to communicate with the personal gaming device and the payment device, and the personal gaming device and the payment device are not configured to directly communicate with one another. In these embodiments, when the game server receives data representing a request to start a play of a game at a desired wager, the game server sends data representing the desired wager to the payment server. The payment server determines whether the player's account balance can cover the desired wager (i.e., includes a monetary balance at least equal to the desired wager).

If the payment server determines that the player's account balance cannot cover the desired wager, the payment server notifies the game server, which then instructs the personal gaming device to display a suitable notification to the player that the player's account balance is too low to place the desired wager. If the payment server determines that the player's account balance can cover the desired wager, the payment server deducts the desired wager from the account balance and notifies the game server. The game server then determines an outcome and any associated award for the play of the game. The game server notifies the payment server of any nonzero award, and the payment server increases the player's account balance by the nonzero award. The game server sends data representing the outcome and any award to the personal gaming device, which displays the outcome and any award.

In certain embodiments, the one or more servers enable web-based game play using a personal gaming device only if the personal gaming device satisfies one or more jurisdictional requirements. In one embodiment, the one or more servers enable web-based game play using the personal gaming device only if the personal gaming device is located within a designated geographic area (such as within certain state or county lines or within the boundaries of a gaming establishment). In this embodiment, the geolocation module of the personal gaming device determines the location of the personal gaming device and sends the location to the one or more servers, which determine whether the personal gaming device is located within the designated geographic area. In various embodiments, the one or more servers enable non-monetary wager-based game play if the personal gaming device is located outside of the designated geographic area.

In various embodiments, the gaming system includes an EGM configured to communicate with a personal gaming device—such as a smartphone, a tablet computer, a desktop computer, or a laptop computer—to enable tethered mobile game play using the personal gaming device. Generally, in these embodiments, the EGM establishes communication with the personal gaming device and enables the player to play games on the EGM remotely via the personal gaming device. In certain embodiments, the gaming system includes

a geo-fence system that enables tethered game play within a particular geographic area but not outside of that geographic area.

In certain embodiments, the gaming system is configured to communicate with a social network server that hosts or partially hosts a social networking website via a data network (such as the Internet) to integrate a player's gaming experience with the player's social networking account. This enables the gaming system to send certain information to the social network server that the social network server can use to create content (such as text, an image, and/or a video) and post it to the player's wall, newsfeed, or similar area of the social networking website accessible by the player's connections (and in certain cases the public) such that the player's connections can view that information. This also enables the gaming system to receive certain information from the social network server, such as the player's likes or dislikes or the player's list of connections. In certain embodiments, the gaming system enables the player to link the player's player account to the player's social networking account(s). This enables the gaming system to, once it identifies the player and initiates a gaming session (such as via the player logging in to a website (or an application) on the player's personal gaming device or via the player inserting the player's player tracking card into an EGM), link that gaming session to the player's social networking account(s). In other embodiments, the gaming system enables the player to link the player's social networking account(s) to individual gaming sessions when desired by providing the required login information.

For instance, in one embodiment, if a player wins a particular award (e.g., a progressive award or a jackpot award) or an award that exceeds a certain threshold (e.g., an award exceeding $1,000), the gaming system sends information about the award to the social network server to enable the server to create associated content (such as a screenshot of the outcome and associated award) and to post that content to the player's wall (or other suitable area) of the social networking website for the player's connections to see (and to entice them to play). In another embodiment, if a player joins a multiplayer game and there is another seat available, the gaming system sends that information to the social network sever to enable the server to create associated content (such as text indicating a vacancy for that particular game) and to post that content to the player's wall (or other suitable area) of the social networking website for the player's connections to see (and to entice them to fill the vacancy). In another embodiment, if the player consents, the gaming system sends advertisement information or offer information to the social network server to enable the social network server to create associated content (such as text or an image reflecting an advertisement and/or an offer) and to post that content to the player's wall (or other suitable area) of the social networking website for the player's connections to see. In another embodiment, the gaming system enables the player to recommend a game to the player's connections by posting a recommendation to the player's wall (or other suitable area) of the social networking website.

It should be appreciated that certain of the gaming systems of the present disclosure, such as EGMs located in a casino or another gaming establishment, include certain components and/or are configured to operate in certain manners that differentiate these systems from general purpose computing devices, i.e., certain personal gaming devices such as desktop computers and laptop computers.

For instance, EGMs are highly regulated to ensure fairness and, in many cases, EGMs are configured to award monetary awards up to multiple millions of dollars. To satisfy security and regulatory requirements in a gaming environment, hardware and/or software architectures are implemented in EGMs that differ significantly from those of general purpose computing devices. For purposes of illustration, a description of EGMs relative to general purpose computing devices and some examples of these additional (or different) hardware and/or software architectures found in EGMs are described below.

At first glance, one might think that adapting general purpose computing device technologies to the gaming industry and EGMs would be a simple proposition because both general purpose computing devices and EGMs employ processors that control a variety of devices. However, due to at least: (1) the regulatory requirements placed on EGMs, (2) the harsh environment in which EGMs operate, (3) security requirements, and (4) fault tolerance requirements, adapting general purpose computing device technologies to EGMs can be quite difficult. Further, techniques and methods for solving a problem in the general purpose computing device industry, such as device compatibility and connectivity issues, might not be adequate in the gaming industry. For instance, a fault or a weakness tolerated in a general purpose computing device, such as security holes in software or frequent crashes, is not tolerated in an EGM because in an EGM these faults can lead to a direct loss of funds from the EGM, such as stolen cash or loss of revenue when the EGM is not operating properly or when the random outcome determination is manipulated.

Certain differences between general purpose computing devices and EGMs are described below. A first difference between EGMs and general purpose computing devices is that EGMs are state-based systems. A state-based system stores and maintains its current state in a non-volatile memory such that, in the event of a power failure or other malfunction, the state-based system can return to that state when the power is restored or the malfunction is remedied. For instance, for a state-based EGM, if the EGM displays an award for a game of chance but the power to the EGM fails before the EGM provides the award to the player, the EGM stores the pre-power failure state in a non-volatile memory, returns to that state upon restoration of power, and provides the award to the player. This requirement affects the software and hardware design on EGMs. General purpose computing devices are not state-based machines, and a majority of data is usually lost when a malfunction occurs on a general purpose computing device.

A second difference between EGMs and general purpose computing devices is that, for regulatory purposes, the software on the EGM utilized to operate the EGM has been designed to be static and monolithic to prevent cheating by the operator of the EGM. For instance, one solution that has been employed in the gaming industry to prevent cheating and to satisfy regulatory requirements has been to manufacture an EGM that can use a proprietary processor running instructions to provide the game of chance from an EPROM or other form of non-volatile memory. The coding instructions on the EPROM are static (non-changeable) and must be approved by a gaming regulators in a particular jurisdiction and installed in the presence of a person representing the gaming jurisdiction. Any changes to any part of the software required to generate the game of chance, such as adding a new device driver used to operate a device during generation of the game of chance, can require burning a new EPROM approved by the gaming jurisdiction and reinstalling the new EPROM on the EGM in the presence of a gaming regulator. Regardless of whether the EPROM solution is used, to gain

approval in most gaming jurisdictions, an EGM must demonstrate sufficient safeguards that prevent an operator or a player of an EGM from manipulating the EGM's hardware and software in a manner that gives him an unfair, and in some cases illegal, advantage.

A third difference between EGMs and general purpose computing devices is authentication—EGMs storing code are configured to authenticate the code to determine if the code is unaltered before executing the code. If the code has been altered, the EGM prevents the code from being executed. The code authentication requirements in the gaming industry affect both hardware and software designs on EGMs. Certain EGMs use hash functions to authenticate code. For instance, one EGM stores game program code, a hash function, and an authentication hash (which may be encrypted). Before executing the game program code, the EGM hashes the game program code using the hash function to obtain a result hash and compares the result hash to the authentication hash. If the result hash matches the authentication hash, the EGM determines that the game program code is valid and executes the game program code. If the result hash does not match the authentication hash, the EGM determines that the game program code has been altered (i.e., may have been tampered with) and prevents execution of the game program code.

A fourth difference between EGMs and general purpose computing devices is that EGMs have unique peripheral device requirements that differ from those of a general purpose computing device, such as peripheral device security requirements not usually addressed by general purpose computing devices. For instance, monetary devices, such as coin dispensers, bill validators, and ticket printers and computing devices that are used to govern the input and output of cash or other items having monetary value (such as tickets) to and from an EGM have security requirements that are not typically addressed in general purpose computing devices. Therefore, many general purpose computing device techniques and methods developed to facilitate device connectivity and device compatibility do not address the emphasis placed on security in the gaming industry.

To address some of the issues described above, a number of hardware/software components and architectures are utilized in EGMs that are not typically found in general purpose computing devices. These hardware/software components and architectures, as described below in more detail, include but are not limited to watchdog timers, voltage monitoring systems, state-based software architecture and supporting hardware, specialized communication interfaces, security monitoring, and trusted memory.

Certain EGMs use a watchdog timer to provide a software failure detection mechanism. In a normally-operating EGM, the operating software periodically accesses control registers in the watchdog timer subsystem to "re-trigger" the watchdog. Should the operating software fail to access the control registers within a preset timeframe, the watchdog timer will timeout and generate a system reset. Typical watchdog timer circuits include a loadable timeout counter register to enable the operating software to set the timeout interval within a certain range of time. A differentiating feature of some circuits is that the operating software cannot completely disable the function of the watchdog timer. In other words, the watchdog timer always functions from the time power is applied to the board.

Certain EGMs use several power supply voltages to operate portions of the computer circuitry. These can be generated in a central power supply or locally on the computer board. If any of these voltages falls out of the tolerance limits of the circuitry they power, unpredictable operation of the EGM may result. Though most modern general purpose computing devices include voltage monitoring circuitry, these types of circuits only report voltage status to the operating software. Out of tolerance voltages can cause software malfunction, creating a potential uncontrolled condition in the general purpose computing device. Certain EGMs have power supplies with relatively tighter voltage margins than that required by the operating circuitry. In addition, the voltage monitoring circuitry implemented in certain EGMs typically has two thresholds of control. The first threshold generates a software event that can be detected by the operating software and an error condition then generated. This threshold is triggered when a power supply voltage falls out of the tolerance range of the power supply, but is still within the operating range of the circuitry. The second threshold is set when a power supply voltage falls out of the operating tolerance of the circuitry. In this case, the circuitry generates a reset, halting operation of the EGM.

As described above, certain EGMs are state-based machines. Different functions of the game provided by the EGM (e.g., bet, play, result, points in the graphical presentation, etc.) may be defined as a state. When the EGM moves a game from one state to another, the EGM stores critical data regarding the game software in a custom non-volatile memory subsystem. This ensures that the player's wager and credits are preserved and to minimize potential disputes in the event of a malfunction on the EGM. In general, the EGM does not advance from a first state to a second state until critical information that enables the first state to be reconstructed has been stored. This feature enables the EGM to recover operation to the current state of play in the event of a malfunction, loss of power, etc. that occurred just before the malfunction. In at least one embodiment, the EGM is configured to store such critical information using atomic transactions.

Generally, an atomic operation in computer science refers to a set of operations that can be combined so that they appear to the rest of the system to be a single operation with only two possible outcomes: success or failure. As related to data storage, an atomic transaction may be characterized as series of database operations which either all occur, or all do not occur. A guarantee of atomicity prevents updates to the database occurring only partially, which can result in data corruption.

To ensure the success of atomic transactions relating to critical information to be stored in the EGM memory before a failure event (e.g., malfunction, loss of power, etc.), memory that includes one or more of the following criteria be used: direct memory access capability; data read/write capability which meets or exceeds minimum read/write access characteristics (such as at least 5.08 Mbytes/sec (Read) and/or at least 38.0 Mbytes/sec (Write)). Memory devices that meet or exceed the above criteria may be referred to as "fault-tolerant" memory devices.

Typically, battery-backed RAM devices may be configured to function as fault-tolerant devices according to the above criteria, whereas flash RAM and/or disk drive memory are typically not configurable to function as fault-tolerant devices according to the above criteria. Accordingly, battery-backed RAM devices are typically used to preserve EGM critical data, although other types of non-volatile memory devices may be employed. These memory devices are typically not used in typical general purpose computing devices.

Thus, in at least one embodiment, the EGM is configured to store critical information in fault-tolerant memory (e.g., battery-backed RAM devices) using atomic transactions. Further, in at least one embodiment, the fault-tolerant memory is able to successfully complete all desired atomic transactions (e.g., relating to the storage of EGM critical information) within a time period of 200 milliseconds or less. In at least one embodiment, the time period of 200 milliseconds represents a maximum amount of time for which sufficient power may be available to the various EGM components after a power outage event has occurred at the EGM.

As described previously, the EGM may not advance from a first state to a second state until critical information that enables the first state to be reconstructed has been atomically stored. After the state of the EGM is restored during the play of a game of chance, game play may resume and the game may be completed in a manner that is no different than if the malfunction had not occurred. Thus, for example, when a malfunction occurs during a game of chance, the EGM may be restored to a state in the game of chance just before when the malfunction occurred. The restored state may include metering information and graphical information that was displayed on the EGM in the state before the malfunction. For example, when the malfunction occurs during the play of a card game after the cards have been dealt, the EGM may be restored with the cards that were previously displayed as part of the card game. As another example, a bonus game may be triggered during the play of a game of chance in which a player is required to make a number of selections on a video display screen. When a malfunction has occurred after the player has made one or more selections, the EGM may be restored to a state that shows the graphical presentation just before the malfunction including an indication of selections that have already been made by the player. In general, the EGM may be restored to any state in a plurality of states that occur in the game of chance that occurs while the game of chance is played or to states that occur between the play of a game of chance.

Game history information regarding previous games played such as an amount wagered, the outcome of the game, and the like may also be stored in a non-volatile memory device. The information stored in the non-volatile memory may be detailed enough to reconstruct a portion of the graphical presentation that was previously presented on the EGM and the state of the EGM (e.g., credits) at the time the game of chance was played. The game history information may be utilized in the event of a dispute. For example, a player may decide that in a previous game of chance that they did not receive credit for an award that they believed they won. The game history information may be used to reconstruct the state of the EGM before, during, and/or after the disputed game to demonstrate whether the player was correct or not in the player's assertion.

Another feature of EGMs is that they often include unique interfaces, including serial interfaces, to connect to specific subsystems internal and external to the EGM. The serial devices may have electrical interface requirements that differ from the "standard" EIA serial interfaces provided by general purpose computing devices. These interfaces may include, for example, Fiber Optic Serial, optically coupled serial interfaces, current loop style serial interfaces, etc. In addition, to conserve serial interfaces internally in the EGM, serial devices may be connected in a shared, daisy-chain fashion in which multiple peripheral devices are connected to a single serial channel.

The serial interfaces may be used to transmit information using communication protocols that are unique to the gaming industry. For example, IGT's Netplex is a proprietary communication protocol used for serial communication between EGMs. As another example, SAS is a communication protocol used to transmit information, such as metering information, from an EGM to a remote device. Often SAS is used in conjunction with a player tracking system.

Certain EGMs may alternatively be treated as peripheral devices to a casino communication controller and connected in a shared daisy chain fashion to a single serial interface. In both cases, the peripheral devices are assigned device addresses. If so, the serial controller circuitry must implement a method to generate or detect unique device addresses. General purpose computing device serial ports are not able to do this.

Security monitoring circuits detect intrusion into an EGM by monitoring security switches attached to access doors in the EGM cabinet. Access violations result in suspension of game play and can trigger additional security operations to preserve the current state of game play. These circuits also function when power is off by use of a battery backup. In power-off operation, these circuits continue to monitor the access doors of the EGM. When power is restored, the EGM can determine whether any security violations occurred while power was off, e.g., via software for reading status registers. This can trigger event log entries and further data authentication operations by the EGM software.

Trusted memory devices and/or trusted memory sources are included in an EGM to ensure the authenticity of the software that may be stored on less secure memory subsystems, such as mass storage devices. Trusted memory devices and controlling circuitry are typically designed to not enable modification of the code and data stored in the memory device while the memory device is installed in the EGM. The code and data stored in these devices may include authentication algorithms, random number generators, authentication keys, operating system kernels, etc. The purpose of these trusted memory devices is to provide gaming regulatory authorities a root trusted authority within the computing environment of the EGM that can be tracked and verified as original. This may be accomplished via removal of the trusted memory device from the EGM computer and verification of the secure memory device contents is a separate third party verification device. Once the trusted memory device is verified as authentic, and based on the approval of the verification algorithms included in the trusted device, the EGM is enabled to verify the authenticity of additional code and data that may be located in the gaming computer assembly, such as code and data stored on hard disk drives.

In at least one embodiment, at least a portion of the trusted memory devices/sources may correspond to memory that cannot easily be altered (e.g., "unalterable memory") such as EPROMS, PROMS, Bios, Extended Bios, and/or other memory sources that are able to be configured, verified, and/or authenticated (e.g., for authenticity) in a secure and controlled manner.

According to one embodiment, when a trusted information source is in communication with a remote device via a network, the remote device may employ a verification scheme to verify the identity of the trusted information source. For example, the trusted information source and the remote device may exchange information using public and private encryption keys to verify each other's identities. In another embodiment, the remote device and the trusted

information source may engage in methods using zero knowledge proofs to authenticate each of their respective identities.

EGMs storing trusted information may utilize apparatuses or methods to detect and prevent tampering. For instance, trusted information stored in a trusted memory device may be encrypted to prevent its misuse. In addition, the trusted memory device may be secured behind a locked door. Further, one or more sensors may be coupled to the memory device to detect tampering with the memory device and provide some record of the tampering. In yet another example, the memory device storing trusted information might be designed to detect tampering attempts and clear or erase itself when an attempt at tampering has been detected.

Mass storage devices used in a general purpose computing devices typically enable code and data to be read from and written to the mass storage device. In a gaming environment, modification of the gaming code stored on a mass storage device is strictly controlled and would only be enabled under specific maintenance type events with electronic and physical enablers required. Though this level of security could be provided by software, EGMs that include mass storage devices include hardware level mass storage data protection circuitry that operates at the circuit level to monitor attempts to modify data on the mass storage device and will generate both software and hardware error triggers should a data modification be attempted without the proper electronic and physical enablers being present.

It should be appreciated that the terminology used herein is for the purpose of describing particular aspects only and is not intended to be limiting of the disclosure. For example, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. In another example, the terms "including" and "comprising" and variations thereof, when used in this specification, specify the presence of stated features, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, steps, operations, elements, components, and/or groups thereof. Additionally, a listing of items does not imply that any or all of the items are mutually exclusive nor does a listing of items imply that any or all of the items are collectively exhaustive of anything or in a particular order, unless expressly specified otherwise. Moreover, as used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items. It should be further appreciated that headings of sections provided in this document and the title are for convenience only, and are not to be taken as limiting the disclosure in any way. Furthermore, unless expressly specified otherwise, devices that are in communication with each other need not be in continuous communication with each other and may communicate directly or indirectly through one or more intermediaries.

Various changes and modifications to the present embodiments described herein will be apparent to those skilled in the art. For example, a description of an embodiment with several components in communication with each other does not imply that all such components are required, or that each of the disclosed components must communicate with every other component. On the contrary a variety of optional components are described to illustrate the wide variety of possible embodiments of the present disclosure. As such, these changes and modifications can be made without departing from the spirit and scope of the present subject matter and without diminishing its intended technical scope. It is therefore intended that such changes and modifications be covered by the appended claims.

The invention is claimed as follows:

1. A system comprising:

a processor; and

a memory device that stores a plurality of instructions that, when executed by the processor, cause the processor to:

responsive to a receipt, from a mobile device executing a mobile device application, of first data associated with a first selection of first persistent data associated with a user to manage, cause a first modification of the first persistent data, wherein the first persistent data comprises persistent state data associated with at least two plays of a game, and

responsive to a receipt, from the mobile device executing the mobile device application, of second data associated with a second, different selection of the first persistent data associated with the user to manage, cause a second, different modification of the first persistent data associated with the user.

2. The system of claim **1**, wherein the first modification of the first persistent data associated with the user comprises a deletion of a first part of the first persistent data.

3. The system of claim **2**, wherein the second, different modification of the first persistent data associated with the user comprises a deletion of a second, different part of the first persistent data.

4. The system of claim **1**, wherein at least one of the first modification of the first persistent data associated with the user and the second modification of the first persistent data associated with the user comprises a transfer of at least part of the first persistent data to another user.

5. The system of claim **1**, wherein at least one of the first modification of the first persistent data associated with the user and the second modification of the first persistent data associated with the user comprises a transfer of at least part of the first persistent data from being associated with a first game to being associated with a second, different game.

6. The system of claim **1**, wherein at least one of the first modification of the first persistent data associated with the user and the second modification of the first persistent data associated with the user comprises a transfer of at least part of the first persistent data from being associated with a first gaming establishment to being associated with a second, different gaming establishment.

7. The system of claim **1**, wherein at least part of the first persistent data associated with the user is stored by the mobile device.

8. The system of claim **1**, wherein the persistent state data associated with the at least two plays of the game comprises a saved state of a first game that persists from a first play of the first game played at an electronic gaming machine distinct from the processor to a second, subsequent play of the first game.

9. The system of claim **1**, wherein the persistent state data associated with the at least two plays of the game comprises a quantity of virtual credits accumulated in association with an electronic gaming machine distinct from the processor.

10. A system comprising:

a processor; and

a memory device that stores a plurality of instructions that, when executed by the processor, cause the processor to:

responsive to a receipt, from a mobile device executing a mobile device application, of first data associated with a selection to delete at least part of a saved progress of a game associated with a user, cause a

deletion of the at least part of the saved progress of the game associated with the user, and

responsive to a receipt, from the mobile device executing the mobile device application, of second data associated with a selection to transfer at least part of the saved progress of the game associated with the user to a destination, cause a transfer of the at least part of the saved progress of the game associated with the user to the destination.

11. The system of claim **10**, wherein the destination comprises at least one of another user and another game.

12. A method of operating a system, the method comprising:

responsive to a receipt, from a mobile device executing a mobile device application, of first data associated with a first selection of first persistent data associated with a user to manage, causing, by a processor, a first modification of the first persistent data, wherein the first persistent data comprises persistent state data associated with at least two plays of a game, and

responsive to a receipt, from the mobile device executing the mobile device application, of second data associated with a second, different selection of the first persistent data associated with the user to manage, causing, by the processor, a second, different modification of the first persistent data associated with the user.

13. The method of claim **12**, wherein the first modification of the first persistent data associated with the user comprises a deletion of a first part of the first persistent data.

14. The method of claim **13**, wherein the second, different modification of the first persistent data associated with the user comprises a deletion of a second, different part of the first persistent data.

15. The method of claim **12**, wherein at least one of the first modification of the first persistent data associated with the user and the second modification of the first persistent data associated with the user comprises a transfer of at least part of the first persistent data to another user.

16. The method of claim **12**, wherein at least one of the first modification of the first persistent data associated with the user and the second modification of the first persistent data associated with the user comprises a transfer of at least part of the first persistent data from being associated with a first game to being associated with a second, different game.

17. The method of claim **12**, wherein at least one of the first modification of the first persistent data associated with the user and the second modification of the first persistent data associated with the user comprises a transfer of at least part of the first persistent data from being associated with a first gaming establishment to being associated with a second, different gaming establishment.

18. The method of claim **12**, wherein at least part of the first persistent data associated with the user is stored by the mobile device.

19. The method of claim **12**, wherein the persistent state data associated with the at least two plays of the game comprises a saved state of a first game that persists from a first play of the first game played at an electronic gaming machine distinct from the processor to a second, subsequent play of the first game.

20. The method of claim **12**, wherein the persistent state data associated with the at least two plays of the game comprises a quantity of virtual credits accumulated in association with an electronic gaming machine distinct from the processor.

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